COMPULSORY EDUCATION AND RESILIENCE IN NORTHERN ALASKA: THE ROLE OF SOCIAL LEARNING AND YOUTH IN HEALTHY SUSTAINABLE COMMUNITIES

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Abstract

How can education in the Arctic foster individual and community resilience in a time of rapid social-environmental change? Education and learning, have powerful potential to affect future social-environmental system resilience. This research unpacks and examines the connections and feedbacks among studies of social-environmental systems (SESs), resilience, compulsory education and Indigenous knowledge. The last few decades have witnessed global recognition of rapid climate change in the Arctic; primarily the diminishing cryosphere. This has led to discussion and debate over the role of schools in addressing local knowledge, environmental changes, and community priorities. In the U.S. state of Alaska and in other Arctic regions, the role of compulsory schooling, in particular public schools, in improving the fit between environmental changes, learning practices, and future policies for local to regional Arctic SESs has been largely overlooked. I hypothesize that, as extensions of governments, public schools in the U.S. Arctic and in similar locations offer an opportunity to better link societies and environments through governance. At the individual level, education is a vital component of resilience, but such education must embrace multiple perspectives in its curriculum to honor and access the diverse input offered by local, Indigenous, and Western methods of knowledge production. At the societal scale, schools are an untapped resource with which to meet the challenge of bolstering capacity for proactive adaptation in a time of rapid transformation. Youth in the Arctic will actively shape the future yet currently remain an untapped resource in the pursuit of community resilience. Critical thinking exercises like scenarios development are crucial to build adaptive capacity, in large part through entraining leadership skills based on multiple forms of knowledge brought to bear on the complexity of SES change. This research demonstrates, through three periods of fieldwork between 2012-2016

engaging resident youth and older experts from the Northwest Arctic and North Slope Boroughs, the significance of compulsory, higher, and Indigenous educations to residents. The cumulative results of this interdisciplinary study offer two overarching and generalizable lessons. First, empowering young people through rigorous involvement in multiple knowledge systems, thinking, deliberating, and planning for futures develops a foundation for effective individual and community resilience throughout their adult years. Second, alternative school practices can provide the flexibility, support, and innovation necessary to enable young people to gain Western education but with ample time and space to provide Indigenous knowledge learning and to engage in livelihoods based on their unique environments and the traditions of their ancestors.

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Chapter 1 Introduction

1.1 Introduction

It takes a village to raise a child (African proverb), and it takes a child to raise a village…There are possibilities for village schools to find synergy between their quest for survival and the implementation of Education for Sustainability. (Jürgensen, 2003, p. vii)

How can education in the Arctic foster individual and community resilience in a time of rapid social-environmental change? What methods can be best applied to this complex question that can also contribute to decolonization of the research and bring to the fore the opinions and knowledge of local actors? These two questions, often repeated since Alaskan statehood–though articulated in very different ways–are still timely. In much of the Arctic and in Alaska as a whole, the dependence of governments on natural resources is intertwined with global costs of oil, a rapidly warming climate system, and a legacy of colonization that includes both a history of decades of physical and cultural trauma and modern pressures on children and families, but that yet holds new and exciting opportunities for youth.

These rapid social-ecological changes are complicated by an Alaska public education system wrestling with a legacy of settler dominance, dramatic technological and related societal changes, and federal mandates. While few Alaskans would dispense with government involvement in public education and fewer still would prefer to rely solely on market solutions, citizens have lost faith that public officials and institutions charged with making and implementing policy are doing it effectively; and given that the priorities of remote mixed-economy, subsistence-based communities are adding more complexity to the work of a Legislature that already has trouble agreeing on a state budget, there is worry concerning public

schooling in Alaska. In addition to general citizen demands for accountability, nearly 20% of Alaska's inhabitants are Indigenous and have specific cultural, linguistic, and learning goals tied to their desires for their children. In the Arctic region of Alaska the percentage of Indigenous residents is 64% and 29% of residents are under the age of 18. This combination of environmental change and unique policy conditions has left a vacuum that is shaping the implementation of a suite of new educational and educational research programs in the last two years, the "Every Student Succeeds Act (ESSA)," which is being implemented by a new Alaska Commissioner of Education. These conditions will shape the development of new institutions related to learning, curriculum contents, teacher training, and workforce development in the future. However, research has yet to fully explore the issue of how young people and their communities are connected to broader social-ecological changes, and perhaps more importantly, how they think about adapting to these changes in positive ways. Resilience studies of social-environmental systems (SES) have explored many actors within these systems but have yet to critically examine youth. SES studies in the Arctic and Alaska also tend to analyze the "ecological" rather than the "social" side of the question, and have nearly ignored the role of compulsory education as a major factor in governance and adaptation. On the other hand, studies of Indigenous youth and school systems often do not include the natural-human environment and its effects on how youth interact with culture nor do they address concepts of long-term resilience that tie together individual and community factors of successful adaptation. Both branches of study frequently fail to include the voices and opinions of Arctic residents, be they minors or adults.

There are two reasons that it is especially important to examine the changes in public education through a framework of *resilience* which I broadly define as a quality of a person,

group or ecosystem that lets it retain core functions, values, or behaviors, even when experiencing perturbation or perilous circumstances. First, resilience thinking is scalable, flexible, and multidisciplinary, and enables us to investigate and probe processes and systems to better understand how and why they work, as well as the inverse: why are some systems not resilient? "Identification of multiple levels within a person's ecology that impact resilience enhances the possibility of targeting a variety of contexts in which to intervene in order to reduce risk, increase resources and strengthen protective systems" (Wright & Masten, 2015, p. 17). Resilience as a concept is covered in depth in chapter 2, but here we should remember that this concept has become a dominant idea in SES analyses, and studies of the Arctic. In this study it is at both the individual and community scales—though these literatures, themselves, do not always intersect—to evaluate Northern Alaska's formal or Western educational systems and their resilience (or lack of same) in both the past and the present. Second, resilience studies are multidisciplinary and open to mixed methods approaches because they address complex systems undergoing change. These studies explicitly acknowledge the importance of Indigenous Knowledge (IK) using Indigenous ways of studying problems and acknowledging the holistic and complex nature of the issues currently facing communities in the Alaskan Arctic. Acknowledging these facets has allowed me to use methods informed by Indigenous scholars (e.g. deep listening, acknowledgement of historical and ongoing trauma, resident participation in research, storytelling) in conjunction with Western research tools (e.g., surveys, literature review, scenarios processes). Resilience is also inherently about thinking of the future—what are the core attributes of my self and of my community that I want to preserve through time in the face of perturbation? This provides a good anchor for the use of participatory scenarios, which are also open to multiple forms of knowledge.

This dissertation aims to contribute to the understanding of the role of compulsory (K-12) public education in fostering individual and community resilience in Arctic Alaska. This first chapter explains the context and methods, and points to the importance of amplifying the remote, primarily Indigenous community voices of Arctic Alaska to control their own fates. How do various levels of governments (from federal level down to municipal and school boards) and their constituents (both students and adults, but also community members) design effective educational systems to address rapidly changing social-environmental conditions? Can new institutional arrangements produce changes in social practices? How do current theories measure the successes and failures of such efforts and what policy reforms might be offered?

This study is intended to be both theoretical and practical. Analysis of the educational systems in Alaska, in particular in Arctic Alaska, was completed to create a conceptual model based on direct local input that could permit greater local control over schooling based on a recognition of the tight links between community-scale adaptation, individual student resilience, and the role of compulsory schooling as a form of governance in a SES. My data is drawn from empirical studies of students within the Northwest Arctic and North Slope boroughs—and from extensive literature reviews from diverse disciplines.

1.2 Positionality Statement

I come to this work as an educator who holds equitable development, delivery, and evaluation of compulsory schooling procedures, curriculum, and testing as the gold standard for measuring the fit between educational processes and the goals of learners and their communities. I have worked in the field for over twenty years from classroom teacher to instructional coach and hold Professional Teaching Credentials in Alaska and California as well as Professional

Administrative Credential in the former and am eligible in the latter. Because of and from this experience, I felt it more appropriate to use the first person singular pronoun in narrating and describing the research conducted and prior experiences relevant to the projects. I chose to employ this style because of the importance of the narrative element of storytelling within the project. Across my fieldwork young people, teachers, parents, administrators, concerned community members, social workers and others with in-depth knowledge of the role and practice of education in the Northwest Arctic and North Slope Boroughs told me their stories. They did this formally through interviews and surveys, but also through narrating their experiences in and with education to me. It is the combination that has let me truly do research, and research that matters to Arctic Alaska communities. Many participants in my research projects, and local people facilitating my research projects, taught me about their lives and livelihoods, their views on the future and the role of education in it, and in particular how rural, primarily Indigenous communities view learning. This invaluable aspect of my research deserves to be highlighted with explicit placement of the "I" within in the social-ecological system of the research itself as well as the research context. In respect of the holistic nature of Indigenous knowledge - from which I have learned that the "I" is always a part of a larger interconnected whole - use of the third person in attempts to create a fourth wall between audience and research stage would be disingenuous. Linda Tuhiwai Smith (2012, p. 1) writes:

> From the vantage point of the colonized, a position from which I write and choose to privilege, the term 'research' is inextricably linked to European imperialism and colonialism. The word itself, 'research,' is probably one of the dirtiest words in the Indigenous world's vocabulary. When mentioned in many indigenous contexts, it stirs up silence, it conjures up bad memories, it raises a smile that is knowing and distrustful.

The most powerful "teachers" in this research process, Indigenous and non-Indigenous participants alike, were gracious enough to not be silent and my positional use of "I" is designed to ensure their contributions are acknowledged.

Stylistically, the first person as stylistic element is largely accepted in the social sciences. "Used broadly across the social sciences, the sixth edition of the Publication Manual of the American Psychological Association (APA, 2010) specifically prescribed use of the first person and active voice by authors, in order to ensure accurate attribution of action" (Shelton, 2015, p. 2). This accuracy is especially important considering the number of collaborators and research partners involved in the three main projects that served the research thesis. The APA guide utilizes a number of instances where the first person is preferred over a distanced third person approach. "In addition to specifying use of the first person for clarity of attribution and assuring use of active, rather than passive, voice, the APA 6th edition provided explicit examples of first person writing in other contexts on multiple pages: 43, 48, 54, 57, 58, 63, 64, 80, 81" (Shelton, 2015, p. 2). It merits stating that, throughout the research process I have worked to be cognizant of my position as a descendant of European immigrants, an educator, and now a researcher. As Dhillon (2017, p. 40) reflects in her own project related to Indigenous youth in Saskatoon (Province of Saskatchewan, Canada) on coming from the perspective of a child of immigrants from Northern India, I too am present in the telling of the stories that undergird my work. To not be transparent is to not respect the context of my participants' lives. In sum, this work presented in my dissertation is not research that exists solely on my computer. This is an action research type of project, discussed more below, in which I collaborated with research participants in the production of new knowledge, albeit about some old questions at times. These people were not

subjects on which I conducted research, but participants whose contributions deserve their own pronouns.

1.3 Problem Context

The central question posed by this dissertation is: *How can public education in Arctic Alaska foster individual and community resilience in a time of rapid social-environmental change?*

My dissertation focuses primarily on public education systems in two boroughs in Alaska: the North Slope Borough and the Northwest Arctic Borough. The implementation of and resistance to, the No Child Left Behind Act of 2002 (NCLB) has created an educational context in Alaska in the last two decades that has highlighted the colonial legacy and state-federal disputes alongside strong efforts by Indigenous groups to reclaim their educational pathways. The national Every Student Succeeds Act (ESSA) and new state leadership has created an opportunity to analyze, reflect upon, and change the way education is carried out in this state to improve Alaska Native learning outcomes, equity, and student success. It is much too early to even speculate on ESSA outcomes for the state of Alaska, but it represents a change in tone and content of state to communities dialogue that has reinvigorated rural public schooling advocates, school personnel, community members and researchers. This presents an excellent opportunity to examine my overarching question. First, these two Arctic boroughs are culturally similar, consisting predominantly of Iñupiat, and share similar pathways of colonization, though these diverge with the "oil era." Second, they operate under the same incorporated borough school system processes. Third, they both are among the wealthiest rural boroughs thanks to significant funding from natural resource extraction. These two school systems capitalize on funding

opportunities through borough revenue that have enabled some local-scale concerns (Indigenous and non-Indigenous) to gain priority, such as alternative schooling and attempts to indigenize the curriculum. Fourth, they are structurally similar, consisting of one hub town each and many surrounding villages. Both are tied to Fairbanks as the nearest major city with significant medical and other socially relevant infrastructure. Fifth, they face similar pressures in relation to SES changes that will affect subsistence, coastal infrastructure, marketplace development, and ultimately their school systems. What is clear across both boroughs is the need for a compulsory education plan in the coming decades that is better suited to the region—so that the compulsory education system empowers, governs, and equips youth to be resilient and their communities to adapt to change in positive ways, not maladaptive ones.

1.3.1 Arctic Social-Environmental Change

The future is uncertain and the societies of northern latitudes are experiencing raplex change, defined as change that is both rapidly changing and complex (Lindgren & Bandhold, 2009).

> The Arctic is changing rapidly in ways that interact and fundamentally affect the region's ecosystems and societies…Climate change is important, but it is not the only driver of rapid changes in the Arctic. In many contexts, social, political and economic drivers may be of greater importance than global climate change. (Larsen & Fondahl, 2014, pp. x and 32)

Issues such as migration, pressure to develop resources, socio-cultural dislocation (manifested in higher than average rates of suicide, substance abuse and domestic violence), shifting modes of governance, rising global interest hinged upon increased access to the Arctic, and myriad other

changes affecting Arctic Alaska demonstrate that the social-environmental systems of the Arctic are in flux (Young, 2010; Lovecraft & Eicken, 2011; AMAP, 2012; ARIR, 2013; Walsh, 2013; Larsen & Fondahl, 2014). Climate change is a looming concern and has come to be accepted as part of the future of Arctic Alaska. One of the most prominent among the changes is the extent of summer sea ice, which has been in dramatic decline since 2007 compared to previous years' data (Serreze & Stroeve, 2015). This impacts a whole range of species, as well as the ability to travel and access a range of sea ice-dependent socio-economic and cultural services (Lovecraft, 2013). With a potential total lack of summer sea ice by 2030, there is no question that the Arctic communities of Alaska will grapple with new opportunities, problems, and issues such as increases in marine shipping and tourism and heightened interests in Arctic security (Meier et al., 2014). Sea ice loss also threatens food security (ICCA, 2015), which in turn threatens culturally significant aspects of Indigenous Knowledge education such as language learning and retention, landscape and seascape observational capacities, and reinforcement of Iñupiaq values.

Rapid social-ecological coupled changes in Arctic Alaska are accompanied by a public education system wrestling with a legacy of colonialism, modern pressures of societal change, and government mandates. The legacy of colonialism can be seen in the minimal gains in trust, efficacy, and equity seen across the history of Alaskan public schooling as a whole. From the outset, the objectives of education systems imposed on Alaska Natives from the majority's settler culture have been predicated on subjugation of Alaska Native ways and assimilation of Native peoples into the majority system. Dinero (2004) and Hirshberg (2008) identified that these mandated school systems centered on control over any elements of social justice or liberation. Cultural assimilation was a long-held assumption and a damaging conclusion to much pedagogy, scholarship, and policy enacted to "fix" the Indian problem across the United States and in

Alaska (Huffman, 2010; Deloria & Wildcat, 2001; Swisher & Tippeconnic, 1999). This has reverberated through decades of dysfunctional and disconnected schooling for generations of Indigenous people disenfranchised from Western society and sometimes from their own home culture due to physical and emotional abuse, attempts at linguistic and cultural eradication, and a general mistrust of anything related to systems purported to "educate" (Barnhardt, C., 2001; Darnell, 1979; Darnell & Hoem, 1996; Dauenhauer, 1997; Hirshberg, 2008; Ilutsik, 1998; Kawagley, 2006; Ongtooguk, 2000).

Colonization's effects did not come to a halt with previous generations; its trickle-down effects have impacted parents, grandparents and even the legacy of schooling that is currently being delivered. Although public schooling in rural Arctic communities has come miles from where it once was, evidence of colonization and assimilation at the hands of the public school system in Alaska still persists. Students in Arctic rural communities wrestle with the confluence of Indigenous ways, which include extended time on the land, and the draw of social media, technology, and the dominance of Western culture. Many of these pressures push students in directions for which the school systems have not been responsive. Communities have called for more supportive and flexible alternative schooling methods and techniques than typical public school offerings. The composition of families and communities, and the support they once offered for struggling families and their students has also changed. Students, teachers, schools, and communities feel the pressures and perturbations from these changes on a daily basis. School systems face the question of how to adapt, how to mitigate, and how to facilitate students finding a way through this complex context successfully.

1.3.2 Education in the Arctic at a Crossroads

Education is at a crossroads as society moves into the second decade of the new millennium. Considered from a panarchy continuum perspective (Gunderson & Holling, 2002), conservation of the outdated educational model in many Arctic locations across primarily Indigenous communities is coming to a close and society appears to be embarking on a release to renewal phase in the course of the education systems' evolution in the United States as well as abroad. "The long history of failure of external efforts to manage the lives and needs of Native people made it clear that outside interventions were not the solution to the problems, and that Native communities themselves would have to shoulder a major share of the responsibility for carving out a new future" (Barnhardt, R., 2016, p. 6). Innovations are primed to shift systems to a new paradigm and understanding of teaching, learning, wisdom, knowledge, and information. Alaska has the potential to lead a transformation of education into a positive agent of foresight and adaptation. Education has long been based on an outdated agrarian model with little flexibility, but this is beginning to change slowly in pockets. Schools have for too long tended toward a factory-model adept at churning out consumers apt at navigating a capitalist system run by powerful corporations. There is real opportunity here and now to affect how and what humans learn on a global scale. It necessitates charismatic leaders and visionary thinkers from within communities and from outside the state. How can the field of public education call these types of people back to the field to regenerate context-specific, local, place-based, sustainable and resilient educational environments so that society can rediscover "what it is to be human and what it is to be alive" as asked in the film, *Schooling the World: The White Man's Last Burden* (Grossan, Hurst, Marlens, & Black, 2010)? Individuals and communities must build local capacity for resilience and adaptation in rural and urban schools through a sustainability

curriculum for healthy communities to survive and thrive into the next century, now. Further explication of implications and efforts toward self-determination and sovereignty are included in chapter 4.

Government mandates have placed rural, largely Indigenous school districts in a difficult situation over the past several decades. At the federal level, the No Child Left Behind (NCLB) Act's policy outcomes have not produced equity in access to high-quality instruction or outcomes in Alaska's public schools. A law that sought universal outcomes for students in a variety of contexts has not equalized student achievement in the areas it should have impacted. Considering that Alaska's environment and geography are literally and figuratively thousands of physical miles from Washington D.C., it is no wonder that NCLB has been a difficult fit. Interestingly, only one of Alaska's three Alaskan Congressmen, Senator Ted Stevens, actually voted for NCLB in 2002. NCLB had many implementation challenges from the outset, and its mandates adversely affected education in Alaska's rural communities. However, NCLB was useful in one aspect: it was the first time assessment data were disaggregated so that educators, policy makers and parents could systematically look at results by ethnicity. But overall, NCLB did more harm than good in Alaska; Alaska's measure of adequate yearly progress (AYP) was not based on a growth model and ultimately ended up generating mostly deficit-model perspectives on Alaska Native students, fulfilling the at-risk prophecy of the assimilation public education model.

Additional state policies to blame for the lackluster outcomes for Alaska Native students are the measurements of the outcomes themselves. The disparity between Alaska Native students and white students on standardized assessments reveals this chasm (Jones & Ongtooguk, 2002). These assessments are not *the* bridge. The assessments could be part of a multi-tiered bridge to

success but educators, policy makers, and stakeholders have an incomplete set of indicators to gauge the success of Alaska Native students. Jones and Ongtooguk (2002) explain that this simplistic view of learning outcomes may also be exacerbating many of the problems that compound the struggles of Alaska Native students, such as "increased rates of dropouts, retentions, special education referrals, teaching to the test, and drill-and-practice pedagogy" (p. 500). As McBeath and Reyes (2008) note, these problems were around before accountability and assessments were on the scene and the new high-stakes accountability has done little to bring equity to the Alaskan school system. Using assessment data to focus on the achievement gap has largely not improved schooling for the students with needs that are not addressed in a standardized curriculum. Ladson-Billings (2006) notes that the "achievement gap," especially via the standardized testing regime, distracts educators and society from the heart of the matter. Ladson-Billings writes:

> I want to use this opportunity to call into question the wisdom of focusing on the achievement gap as a way of explaining and understanding the persistent inequality that exists (and has always existed) in our nation's schools. I want to argue that this all-out focus on the "Achievement Gap" moves us toward short-term solutions that are unlikely to address the long-term underlying problem. (2006, p. 4)

In addition, Jones and Ongtooguk found that these systemic problems in the response to high-stakes accountability are even more pervasive in negative outcomes for Alaska Native students in the urban centers of Alaska because their learning is farther removed from context and employs even less place-based curricula (2002). This ultimate quantification of educational outcomes is based on short-term thinking that short-changes the school system out of success in

reaching all student populations but even more so Alaska Native students. The *Arctic Human Development Reports I & II* (Einarsson, Larsen, Nilsson & Young, 2004; Larsen & Fondahl, 2014) have identified that many Arctic communities continue to grapple with the balance between local control and determination of their schools and curricula and state-generated mandates that are unsupportive of self-determination. As chapter 2 points out, governments can be barriers but may also be bridges to a more holistic, place-based approach to education that can incorporate multiple forms of knowledge. This is an area for further research as well as increased communication among Arctic communities. There is little question that self-determination in learning at an individual level and a community level empowers both the individual and the community. Data gathered for the report on education reform in Norway and its impact on student learning makes the point. "All students expressed the wish to have influence on what and how they were learning" (Johansson, 2004, p.174). Without the sense of ownership that learning requires, it becomes disconnected and an inflicted control mechanism that students as subjects half-heartedly accept as their charge.

Determination in educational content and pedagogical methods is of utmost importance in revitalizing and sustaining Indigenous Knowledge (IK) revitalization as well. IK comprises the complex set of languages, teachings, and technologies developed and sustained by Indigenous civilizations. Often oral and symbolic, it is transmitted through performance and the structure of Indigenous languages and passed on to the next generation through oral tradition in modeling, ceremonies, problem-solving, and animation, rather than through the written word. "IK is typically embedded in the cumulative experience and teachings of Indigenous peoples rather than in a library or in journals of applied research" (Battiste, 2008, p. 87).

1.4 Other Forms of Knowing: Indigenous Knowledge

Because of these and many other factors IK is difficult to define within a Eurocentric (colonial) knowledge framework and varies from Indigenous person to Indigenous person, tribe to tribe, and region to region. Battiste (2008) explains that IK is systemic, observable, and thinkable and that it includes and is based in Indigenous language, culture, and experience; in sum, it incorporates ways of knowing, being, doing, and thinking. IK equips Indigenous youth with the wherewithal to survive and the ability to succeed (Okakok, 1989). Okakok further defines IK as humanistic, holistic, and connected to local and collective relationships. The Inuit Circumpolar Council (ICC) defines and discusses Indigenous Knowledge specific to Alaska's Inuit populations:

> Indigenous Knowledge (IK) is a systematic way of thinking applied to phenomena across biological, physical, cultural and spiritual systems. It includes insights based on evidence acquired through direct and long-term experiences and extensive and multigenerational observations, lessons and skills. It has developed over millennia and is still developing in a living process, including knowledge acquired today and in the future, and it is passed on from generation to generation. (ICC-Alaska, 2015, p. 7)

This focus on systems thinking and holistic observation is significant to note, but the ICC definition further elaborates:

> Under this definition, IK goes beyond observations and ecological knowledge, offering a unique "way of knowing." This knowledge can identify research needs and be applied to them, which will ultimately inform decision-makers. There is a need to utilize both, Indigenous and scientific knowledge. Both ways of knowing will benefit the people, land and animals within the Arctic.

This "way of knowing" beyond empirical data based on observations and ecological knowledge can make Western science uncomfortable. In other words, Western sciences, in particular Arctic sciences, find empirical data added from "Indigenous science" to be of high value, but the formal Western educational system has yet to acknowledge this shift in altering how it collects evidence or shapes knowledge to incorporate IK, reflecting how a holistic system operates. Bang, Warren, Rosebery, & Medin (2012) document this in an article with the title "Desettling Expectations in Science Education." The title is important. They explain cases of students offering perspectives, for example, of "non-living" things as sharing qualities of "life" such as water or the sun, that could be proxies for many Indigenous knowledges, and being quickly shut down in classrooms, even though these perspectives have value in the classroom pursuit of knowledge acquisition and governance for stewardship. The importance of the concept of "desettling expectations" is also connected to Peter Kelly's work with youth, which he calls "untimely." In short, the dominant, hegemonic, knowledge system seeks to make both youth and Indigenous people "knowable, and governable" (Kelly, 2011, p. 47) and yet does not seek to know them at all. The reality is that deep understanding of, listening to, and co-producing knowledge with young people and Indigenous people, and particularly with Indigenous youth, is not part of mainstream approaches towards education, Indigeneity, nor youth. This research and teaching unsettles the dominant modes of research and teaching, and it is untimely because the time is now, even if it is not fully accepted by all. Given the rapid and complex changes in the Arctic, it is more than just evidence from IK or training future leaders that matters. The basis of both IK and Western knowledge is "knowing," and a knowledge system so "settled" that it cannot adapt to new realities is highly problematic. My work argues for what Bang, Warren, Rosebery, & Medin (2012) also support:

> Serious intentional engagement with understanding of nature-culture relations emerging within modern scientific fields…the settled knowledge paradigm of science education can fail, for good reasons, to persuade students of their epistemic and moral authority. Further, we would suggest that a desettling frame in science learning and teaching would take the entanglement of relations between humans, organisms of all kinds, matter, and environments as the centering site of inquiry, not merely as the alternative…These shifts entail movement away from hierarchically organized frames in which humans stand apart from and dominate nature toward relational frames in which humans are part of thickly networked [existence]. (p. 315)

The sum of my dissertation argues along parallel lines, not just in science education, but also across the school systems of Alaska. It is time to unsettle the current relationship that "includes" some IK to create a mode of teaching and learning that combines IK and Western learning for all students, Indigenous and non-Indigenous, in order to rework how youth think about their social-ecological systems.

These are all aspects that the modern state-mandated education system would have a difficult time identifying or quantifying. It is no wonder that these systems have failed to achieve success in rural Alaska communities. It is significant to my research that the qualities of knowledge and learning and the connectivity noted in the practice of IK also typically lead to greater resilience in the face of perturbations. Brayboy (2008) notes that IK fosters a sense of humility that enables the incorporation of outside resources and other ways of knowing, being and doing: it is an innately flexible knowledge system. These authors' definitions are neither exclusive nor all-inclusive but these three perspectives provide a well-rounded foundation from which to build my study. IK is based in a breadth of education that is political, in terms of

teaching about power relationships, and takes place throughout day-to-day living (Brayboy, 2008).

Elders and community members are traditionally the bearers of Indigenous knowledge(s) and are therefore vital contributors to a curriculum based in Indigenous knowledge(s). Typically the best sources for Indigenous knowledge are the Elders in a community. To support Alaska Native language revitalization and Indigenous knowledge security, Elder knowledge and language bearers of the community must be integrated into the educational process in rural Alaskan communities. Community participation must go deeper than simply involvement in a lesson here or there; and the issue of token versus genuine participation in the public schooling process by community members has been an ongoing problem in the quest for local-based learning.

School leaders are in a position to bridge community and school so that the two reflect and respond to each other's needs. For each community it means striking a different balance, but a balance nonetheless. A balanced curriculum would allocate space for Indigenous knowledge(s) and Western modes, local/community values and global/national standards, and time on the land/waters and in the classroom. In general, for any student, curricula work best when built around something tangible, i.e. an actual product, be it useful or aesthetic. These tangible outcomes are the key to exchange and interaction between school and community and therefore the key to involving Elders. Students find intrinsic motivation in producing real-life products, which provide a substantial opportunity for including Elders in teaching and learning (Barnhardt, R., 1981).

There is a pressing need for communities in Northern Alaska to be resilient in the face of rapid cultural, social, economic, and environmental change and the ongoing perturbations from

changes (e.g., cultural, social, environmental, and climate). Recently it has been proposed that new governing institutions, or reorganization of institutional arrangements, can facilitate better decision-making by governments and public authorities to manage the environment and related concerns (Young, 2002; Ostrom, 2010; Lovecraft, Meek & Eicken, 2013). Public schooling institutions that include local and Indigenous participation in decision-making can fulfill the potential of improved governance over local concerns. As chapter 2 notes, I consider the compulsory public schooling to be a form of governance. Here I explain the importance of this theoretical shift in resilience studies: with populations of 3,000—5,000 in the hub communities and the smaller villages ranging from 100—500 people, the North Slope Borough (NSB) and Northwest Arctic Borough (NAB) present opportunities for smaller nodes of governance. These can be more effective due to small community sizes, which enable heightened face-to-face deliberation and system feedback. These nodes function as a conduit for policy coming from the top down and action and enactment coming from the permafrost up. Because of the state of Alaska's budget discord and the lack of a diversified revenue portfolio, the state needs to find ways to trim upper-level governance fat while also improving governance effectiveness at the most meaningful scale, the local one. One method to address this would be to shift more of the management, enactment, monitoring, and ground-intensive decision-making in education to smaller, localized governance entities. In Alaska, population is relatively low and costs are so high that there is always the possibility for innovative governance initiatives, especially if they reduce costs. This could mean that innovative strategies in Alaska at small, diverse, and local scales could then find ways to scale up if this kind of governance were successful and useful for larger populations. The current top-heavy top-down methods of governance are complicated and inefficient with too many mixed agendas and special-interest group impacts. However, this

circumstance is hardly predetermined. I recognize that a number of significant actors across Arctic Alaska do not always agree and this can result in years of stalemates or infighting. I simply make the case that unlike trying to turn an entire federal or state government educational mechanism around, local-scale school governance provides a workable venue for place-based innovation. If a community is to be sustainable and healthy, all age groups, from teenagers to the elderly, must be part of the deliberation and bring different skill sets, ideas and imaginings to the issue of education.

1.5 Methodologies and Data Collection

This dissertation adopts a qualitative mixed-methods approach (Creswell, 2009, 2012), but knitted together in a logical way to best answer the questions posed. In addition to a deep review of literature, my in-depth interviews, surveys, participant observations and action research protocol each illuminate a specific aspect of my overarching question and subquestions (see Table 1). All three methods—the participant observation was grounded in action research so I count this as a single method—were designed with recent input about "de-colonizing" research. I selected different methods to approach different questions because the unusual blend of local, Indigenous, state, and federal concerns create institutional arrangements in which some of the established methods of evaluating governance, education, and resilience do not apply in the same way they might to any singular discipline's study of the problem. Furthermore, I am aware that this approach may not satisfy any singular disciplinary concern, but it does primarily address resilience studies (biological and social), education studies, and Indigenous studies in its honest effort to understand the complex "whole" of the Arctic Alaska educational system and its relation to regional change and community resilience. This whole cannot simply be taken apart

and looked at piece by piece through each discipline because *the whole is more than the sum of its parts.*

1.5.1 Phases and Methodological Formats

What follows is a discussion of the methods I employed to co-produce knowledge with a goal of beginning to decolonize current research methods across three fields of study: public education, resilience, and futures studies. I generated a basic frame of questions and methods for the research but left the process open to tangents so as to allow the wiggle room necessary to thoughtfully and provokingly convey the importance of what participants allowed me to observe. In the first phase (2010–2012), I explored the resilience and adaptation literature as a fellow in the Resilience and Adaptation Program at UAF and from this developed a social and ecological understanding of resilience. In addition, I spent the Spring 2011 semester as a visiting scholar at the UiT the Arctic University of Norway to explore and compare Saami and Alaska Native cultures and educational concerns. But the capstone for phase one was to experience how education functions in Arctic locations, through a school district internship (September—November 2012). In Utqiaġvik (Barrow) I had the opportunity to work with the school system, to acquire practical literature in terms of reports and other materials not widely distributed, and to develop a study of alternative schools that helped me contextualize how I wanted to examine the key factors in school systems that might enhance individual and community resilience, and the role of Indigenous peoples in school systems. Information and knowledge from this first phase guided a second qualitative phase towards the end of my internship. In this second phase (2012—2013), I used qualitative interviews, surveys, scenarios, and observations to probe the condition of four specific communities where there seemed to be a significant relationship

between education and community resilience, by exploring aspects of a community's role in public education with community members. Given the gap in research connecting individual and community resilience, as well as the difficulty of doing in-depth community-scale research with minors, my work utilized three overlapping sets of research projects (qualitative interviews, scenarios development workshops and surveys) to examine 1) to examine resilience in youth at the individual to school level; 2) resilience in youth in relation to how they themselves think about futures; and 3) resilience in communities in relation to education and futures.

Mixed methods are useful for addressing complex problems as well as revealing complex results when tackling the type of interdisciplinary research question at the heart of my research: When and how does education build future (individual and community) resilience? Mixed methods allowed the opportunity to approach a complex concept like resilience and the ways it is impacted by education and futures thinking. This triangulation of differing data sets through mixed methods improved the conclusions through reliance on the strengths of the forms of qualitative and quantitative data gathered (Creswell, 2012). These mixed methods also provided ample opportunity and space for attempting to acknowledge and integrate others' worldviews, especially Indigenous and Iñupiaq, which were often different from my own. The mixed methods approach also provided the flexibility for my research project to deploy the method or instrument best suited as follow-up to previous steps in the process, as well as to find the most illuminating method to continue the process and to reach practical conclusions and possible directions for improvement and future work.

More specifically, across the dissertation as a whole, I employed a sequential mixed-methods (Creswell, 2014) approach to data collection. This approach succeeds when developing an emerging theory and testing for connections and relationships between aspects of the system

(Creswell, 2014). In phase two I performed a similar case study analysis of alternative schooling through in-depth interviews across three North Slope Borough communities (King, Keohane, & Verba, 1994; Van Evera, 1997). In the third phase of my research (2014—2016) I worked with the Northern Alaska Scenarios Project (NASP) to learn from residents in the two Arctic boroughs about what contributes to healthy sustainable communities, in particular listening and inquiring about the role of educational practices. Pre- and post-workshop surveys were administered to 49 participants in the NASP over the course of 3 workshops in 12 months from February 2015—February 2016. The final count of useable surveys was 47. In addition, each workshop was designed around co-production of knowledge in relation to thinking about the key factors of maintaining healthy sustainable communities into the future. The fourth and final phase of my research (2016—2017) was with high school students in Northwest Arctic Borough. I led a scenarios development workshop, based on the NASP model but adapted for high school students from all the communities of the NAB. My commitment to a consistent but mixed set of methods enabled me to understand the complex issues surrounding public schools in rural communities, their ties to resilience, and what this might look like for rural Arctic communities by mid-century. The interdisciplinary foundation from which my research questions were developed also necessitated a mixed-methods approach to understanding the multiple inputs to the complex systems of education, resilience and futures. This approach yielded results that were much richer than would have been discovered through only qualitative or quantitative approaches. Each step was an attempt to further investigate the root causes of fractured resilience, dysfunctional schooling, and visions and security in uncertain futures.

1.5.2 The Guiding Role of Participant Action Research

Having been engaged in action research projects since my master's degree in Educational Leadership and Policy Studies and my time as a Literacy and Leadership working in the Los Angeles Unified School District, the emphasis on action research guiding my project was important. Stringer (2014) identifies three vital characteristics of action research as a mode of human inquiry:

> 1) decentralization, an emphasis on local context and application, 2) deregulation, from restrictive research conventions and allow freedom for innovation and, 3) cooperativeness in execution, researcher and participant are equals in the research process (x-xi)… Action research therefore is based on the proposition that generalized solutions, plans, or programs may not fit all contexts or groups to whom they are applied and that the purpose of inquiry is to find an appropriate solution for the particular dynamics at work in a local situation. (Stringer, 2014, p. 6)

From the initial interviews in Point Lay and Point Hope to the Arctic Futures Makers post-workshop surveys, my intent was to provide open space for participants to share their experiences about education, resilience and the future. I worked to develop methods that allowed for co-production of knowledge. Oftentimes in the research process, I simply brought structures, procedures, and the process through which participants would share and create their own experiences. In an attempt to have student participants identify, interrogate, and intervene in the conditions of their own lives, we engaged in a scenarios development project that posed the focal question "What is needed to have healthy sustainable communities in NWAB by 2040?" The students can offer firsthand experience, knowledge, and imagination when considering the conditions of their environment, schooling and futures. The scenarios development process is a

learning process itself incorporating reflection, deliberation, prioritization and self-determination. The process is problem-based and learner-centered and requires high levels of critical thinking.

Arctic Futures Makers was an initial exploratory step in the process that scenarios development exercises adopt for understanding how local control might be shifted away from state mandates and district offices. When and if this work is continued in my follow-up pursuits of education resilience and futures studies, I anticipate that the ownership and amount of action by participants will continue to shift in their direction as we move towards outcomes, action plans and next steps for the community. Participant Action Research (PAR) is an approach and umbrella end-goal that should frame most work of this kind of research examining rural Alaska education systems, their outcomes and futures. PAR consists of many of these mixed methods that I have employed here; however, in my eyes the planning and collaboration need to be stronger from the outset to have a true PAR project of the nature I strive for in the future. PAR starts with the assumption that knowledge is embedded in social relations and "is most powerful when produced collaboratively through action" (Fine et al., 2003).

All these approaches were sensitive to and designed with input from recent scholarship about "de-colonizing" research methods (Smith, 2012). The research methods employed were decolonized methods in that they allowed for freedom of expression outside the constructs of the research. That being said, the surveys were somewhat closed in nature in order to determine and develop data from which to derive and evaluate the rest of the methodology, i.e. the scenarios workshop for Northwest Arctic Borough School District (NWABSD). We co-produced knowledge but I am also acutely aware of where and when the co-production ends and my role as researcher reasserts itself. I acknowledge that because my projects were not co-designed with

Alaska Native collaborators specifically at the outset, although they were consulted; my project thus does not pass the rubric of truly decolonized. However, I integrated some of Smith's (2012, pp. 145-163) 25 decolonized projects, taken on by Indigenous communities, into the schema of my project:

1) *Storytelling* – Storytelling was an integral aspect of the scenarios development process at the NASP and Arctic Futures Makers levels. We worked to develop stories about the future to learn how that future may unfold. Smith (2012, p. 146), quoting Bishop, on storytelling's capacity to relinquish control to the teller over the researcher and storytelling's ability to gather a "diversity of truths," demonstrated the shifting dynamics that occur during the creation and telling of story. Furthermore, Archibald (in Smith, 2012, p. 146) writes to story's ability to "educate the body, mind, soul and spirit." From interviewing to representation of scenarios narratives, in my research the stories of participants were what built the project and carried it from stage to stage. The stories uncovered the truths to be further explored in order to better understand the complex issues comprising the problem.

2) *Intervening* – The impetus for the whole project began with the act of Indigenous and non-Indigenous local actors in the communities across the North Slope working to intervene on their students' behalf for better educational outcomes. The goal of the internship was to interview and identify possible methods for incorporating an alternative school or alternative school methods into current school programming. The scenarios development process asked participants to further the process when thinking about what the need for education systems in the future would be and how we might ago about affecting change in that direction in the short term.

3) *Connecting and networking* – The Northern Alaska Scenarios Project was conceived to find methods to better connect Alaska's two Arctic Boroughs so that learning, knowledge, and resources that are typically stretched very thin might be shared across the two regions. Once the scenarios development workshops commenced, face-to-face connections between the boroughs were rekindled and in some cases started anew. It is important to emphasize that this was just a beginning, but obvious value was added via the networking and deliberating around common concerns. Some had interacted via work or email before but to be engaged on a project asking "what if" was a task that required deeper engagement and learning.

4) *Envisioning* – The scenarios development process is rooted in envisioning. Our focal question asked, in slightly varied words for each workshop, "What is needed for healthy sustainable communities in Northern Alaska by 2040?" Through a series of semi-structured follow-up activities participants gathered, deliberated, developed, and shared their visions for their communities' future. "One of the strategies that indigenous peoples have employed effectively to bind people together politically asks that people imagine a future, that they rise above present-day situations which are generally depressing, dream a new dream and set a new vision" (Smith, 2012, p. 153). The outcomes and developments were specific to participants and community characteristics but allowed diverse participants to come together to develop a collective vision of possible futures for the region.

5) *Creating* – Creating based in imagination is a tool for allowing people to think outside the detrimental circumstances they may encounter on a daily basis (Smith, 2012, p. 159). This is the promise of scenarios development exercises, to leave one's worker's, mother's, or student's cap at the door and to sit down free of the constraints of yesterday, today, and tomorrow. Participants are supported to instead think broadly, imaginatively and long-term into futures, and

follow this up with efforts to narratively and logically tell stories to connect the present and the futures in order to explore multiple possible paths. It is in this creating that Smith identifies an act of decolonization from the ruling majority. It is also what futurists ask of participants: to be liberated of their day-to-day perspectives and practices of putting out fires that consume them in the short-term. We instead take a chance through imagination of noticing the potentially larger fire on the horizon that may ultimately be the one that ends us.

Throughout my research process I always attempted to find the best method to get out of the way of my contributors. I used structures and frameworks to help guide the process, but more often than not the most illuminating knowledge came out of the structures in stories or follow-up conversations. As I continue this research in the future, I will rely upon the networks and working relationships I have developed with many people in Arctic Alaska to collaborate and co-design even more effective methods to tune and improve educational programming in Arctic Alaska for increased self-determination, fate control, social justice and resilience for all students.

Table 1 Methods Summary

Research Question and Unit of Analysis	Hypotheses	Method (source)	Interaction between education and community resilience
How can education in the Arctic foster individual and community resilience in a time of rapid social-environmental change? Individual level; regional – group of arctic experts; age-based groups - youth compared to adults; group-level based on school district – Barrow, Pt. Hope, Pt. Lay. [mixed methods, Creswell 2009, 2012] Chapter 1 discusses this overarching question of the dissertation. Chapter 2 provides theoretical orientation to the argument that compulsory schooling is governance; H2. More narrowly it poses the question "Is compulsory schooling governance?" and if so, "How can this governance improve the resilience in Arctic Alaska?" Chapter 6 addresses H3, but it is also broached in Chapter 5. Chapter 7 sums up the findings by addressing H4 in relation to my overarching question.	H1: Compulsory education is a tool of governance that can enhance resilience. H2: Resident Arctic experts (both Indigenous and non-Indigenous) concerned with community health and sustainability* will find great value in the role of education. H3: High school students will consider their education as important for the future of their community. H4: Education, broadly considered as social learning, is directly connected to Arctic resilience at the community scale. *NB: this is the language used in the study. "Healthy and sustainable communities " is a proxy for resilient.	Quantitative surveys pre- and post-event (Creswell, 2009), Participant observation (Yin, 2011), In-depth interviews (Yin, 2011), Participatory scenarios workshops (Fine et al., 2003; Bishop and Hines, 2012), Case study approach (King, Keohane, & Verba, 1994; Van Evera, 1997; Ragin & Becker, 2009), Decolonizing methodologies (Smith, 2012; Dhillon, 2017).	Compulsory education creates a system of governance of minors in which they are enculturated into ways of knowing about their social-ecological systems. Residents of Arctic Alaska value this formal education because it offers youth opportunities to gain skills for economic success. Youth also view their formal education as important to their personal success. Indigenous education, however, is also highly valued—see H5 and H7—and I discuss it in terms of livelihoods for those youth choosing to stay in remote rural communities and/or to participate actively in Iñupiaq cultural pathways. Education must thus be encouraged in two modes and be governed through techniques that foster both modes actively in students' lives. Otherwise, the negative outcomes of schooling—those that divide community members from one another and from their culture—will be repeated in an underrepresented culture. Community resilience is directly connected to social learning, but this learning, in order to create livelihoods for young people, must be tied to the social-ecological system, respecting Iñupiaq language and culture alongside Western science and values. Without Indigenous and non-Indigenous people acquiring IK about Arctic Alaska, there will be no observational expertise of change to continue adaptation.

Table 1 cont.

What role does education play in developing healthy sustainable (resilient) communities? *Individual and group.* Arctic resident experts in health and sustainability across two boroughs—49 participants from North Slope and Northwest Arctic Boroughs across three participatory scenario workshops. Group products from the workshop and individual surveys. Chapter 5 details how the Northern Alaska Scenarios Project participants explain their understanding of social learning, both in terms of compulsory schooling (formal learning) and all other learning, including Indigenous learning (informal learning).	H5: Education will be viewed as a composite of both formal "in-classroom" time as well as informal "cultural learning" by participants, not as an either-or proposition. H6: Both forms of education will be considered highly relevant factors to healthy sustainable communities (resilient communities). H7: The final list of key factors of healthy sustainable (resilient) communities will have both direct and indirect references to social learning. *NB: this methods table is the last place "formal" and "informal" will be used. The terms were in my original hypotheses so I leave them for accuracy. However, this distinction, my research taught me, is not one made by Arctic Alaska resident experts and has negative connotations in terms of settler-colonial expectations.

Quantitative surveys pre- and post-event (Creswell, 2009), Participant observation (Yin, 2011), Action research (Stringer, 2014), Participatory scenarios workshops (Fine et al., 2003; Bishop & Hines, 2012)	Education was frequently discussed both as a state-driven compulsory process but also as an Indigenous process tied to learning language, cultural values, and skills tied to subsistence, travel, and safety on land or waters. Both were viewed as needed for success in the region, which has a mixed subsistence economy with greater job opportunities in the hub cities (Utqiaġvik & Kotzebue) than in remote locations. Participants said that resilient communities rely on a wide range of social learning tied both to schools and to culture and living on the land.

Table 1 cont.

How and why are small communities on the North Slope considering alternative schooling? *Group level* comparative case study of alternative schooling in Pt. Hope, Pt. Lay, and Utqiaġvik (Barrow). *Research review* of Alaska state school system data. Chapter 3 contextualizes the State of Alaska school system to explain the current trends and concerns in the North Slope and Northwest Arctic Borough school districts. Chapter 4 analyzes fieldwork done on the North Slope Borough in relation to communities' desire for alternative schools.	H8: Given the similarity in terms of region and culture, the three communities will have similar understandings of and suggestions for alternative schooling. H9: Pt. Hope and Pt. Lay will be more similar in their results than either will be with Utqiaġvik given the latter's role as a wealthier hub community. H10: The strong role of Iñupiaq culture and values will mean a mix of Indigenous and Western learning practices will be favored across cases.	In-depth interviews (Yin, 2011), Case-study approach (King, Keohane, & Verba, 1994; Van Evera, 1997, Ragin & Becker, 2009)	Different sets of actors in remote, rural school districts favor alternative schooling practices that will enable their young people to gain Western education but also provide time and space to practice Indigenous knowledge and livelihoods connected to living in these areas, their ancestors, and traditions. Utqiaġvik has the critical mass in number of students and available capacity to engage an actual alternative school, whereas the villages will need to look towards moving their delivery model towards an alternative school-type program. This will allow for a more equitable educational mix of Iñupiaq and Western methods to increase flexibility and therefore future resilience.
How do high school students in Arctic Alaska understand the future and their own resilience? *Individual and group.* Twenty-one high school students representing each village and Kotzebue in the Northwest Arctic Borough participated in a two-day workshop. Chapter 6 explains and analyzes the Arctic Future Makers workshop. Youth are treated not only a category of study but also as co-producers of knowledge about community resilience.	H11: Students would be more imaginative in their contemplation of the future. H12: Based on their lived experiences, their key factors would differ significantly from the adults. H13: Students would have varying sources of resilience in their lives but common themes would emerge based on culture and location.	Quantitative surveys pre- and post-event (Creswell, 2009), Participant observation (Yin, 2011)	Students proved to be less imaginative than expected. They needed considerable time to explore the idea of being able to imagine different futures, unlike the adults who quickly understood what they were being asked to imagine. This may be due to over a decade of standardized testing and imposition of a system of schooling that does not foster local cultural traditions. The students' key factors were remarkably similar to those of the adults. This makes sense given the null hypothesis proven in H12. It could also be accounted for by the strong respect for one's Elders' opinions in the region. Students did have some patterns of personal resilience particular to experience, access to resources, and protective factors. As a group, after the workshop they felt their communities were better prepared to face turbulent times—indicating that social learning through participatory scenarios with youth can promote resilience thinking, creating a positive approach in youth towards the future of their communities.

In sum, this study does not employ a singular methodology to measure the impact of education on resilience in Arctic Alaska. Instead it focuses on the interactions between complexity, change, educational environments, and adaptive capacity via three custom survey instruments, case study analysis, in-depth interviews, and participant observation rooted in action research. The instruments and observational strategies were designed based: (i) on previous research on elements of sustainability in Arctic Alaska communities (Kruse et al., 2004; Forbes & Stammler, 2009; Larsen & Fondahl, 2014); (ii) on data gathered at three participatory scenarios workshops held in Utqiaġvik, Kotzebue, and Anchorage, Alaska (February 18-19, 2015; July 8-9, 2015; February 11-12, 2016); and (iii) on previous research, reflected in the literature review sections into three interlinked areas of empirical data: Indigenous educational practices and interactions with state and federal education systems, the practices and effects of futures thinking and social learning, and regional to community-scale resilience.

1.6 Overview of the Dissertation

This study is both timely and needed. As environmental forces rapidly change the nature of living in the Arctic, the modern pressures of social-technological development also press upon the region's youth. New ways of schooling must be adopted to foster student and community resilience. My study analyzes a region through a multi-method, multi-disciplinary approach aimed at redefining the "problem of rural education in Alaska" through local-scale investigation, listening, and participation. Positive changes have taken place over the last several decades; however, these changes and the other key factors of rural resilience have been treated as individual processes instead of representative of an interlinked, interdependent form of governance tying together the social and ecological through compulsory education. This

dissertation develops a mode of thinking about the importance of schooling in Arctic Alaska from the perspective of its residents, including high school students, that can be tied to resilience studies of Arctic communities. It also recommends a general institutional design for the future of Arctic public schooling based on research in communities, literature of self-determination, and study into the role of rural schools in resilience.

Chapter 2 The Role of Public Education in Governance for Resilience in a Rapidly Changing Arctic serves as an overview of my theoretical orientation as it applies to education and resilience in Arctic Alaska. This chapter asks, *Can we consider compulsory schooling as governance?* And if so, *How can this form of governance improve the resilience in Arctic Alaska?* Education and learning possess powerful potential to affect future resilience and sustainable states. This chapter focuses on unpacking and examining the connections and feedbacks between social-ecological systems (SESs), resilience, and compulsory education. SESs have been problematized often with a poor fit between environmental change and policy solutions. The last few decades have witnessed global recognition of climate change in the Arctic, which has led to debate over the role of schools in addressing local knowledge, environmental changes, and community priorities. In Alaska and other Arctic regions, the role of public schools in improving this fit has been largely overlooked. This paper hypothesizes that as extensions of governments, public schools in the North American Arctic and in other locations offer an opportunity to create better linkages between societies and environments through governance. Second, at the individual level, education is a vital component of resilience, but such education must embrace multiple knowledges in its curriculum in order to honor and access the diversity offered by combining local and Indigenous knowledge and Western methods. Lastly, at

the societal scale, schools are an untapped resource to meet the challenge of bolstering capacity for adaptation in a time of rapid transformation for Arctic societies.

Chapter 3 The Current State of Alaska's Public Education System explains the historical context for Indigenous education in the U.S. and the development of the No Child Left Behind and Every Child Succeeds federal programs. It then contextualizes federal policy trends with those in Alaska, specifically in the North Slope and Northwest Arctic borough schools. The chapter's goals are less about testing any hypothesis directly than to set the scene for understanding the major thrusts of my research in chapters 4, 5, and 6. Northern Alaska education, like much of rural education across the state, faces key challenges of school system accountability, turnover in teachers and administrators, and poor communication across cultures and among those concerned with education. This chapter provides the context for why, as described in chapter 4, there is already a movement for alternative schooling, even among some of the smallest schools in the state.

Chapter 4 Alternative School Practices for Indigenous Students: North Slope Case Study examines the problems that can arise when trying to combine Indigenous and compulsory schooling. In short, the push for alternative schools on the North Slope is in many ways a window into what is and is not working for students who do not fit the "Western schooling" mode and yet do have interest in education. The chapter considers *How and why are small communities on the North Slope considering alternative schooling?*

Chapter 5 The Roles of Education and Youth in Arctic Alaska: Regional Case Study assesses the outcomes of three participatory scenarios workshops held in 2015—2016 focused on Northern Alaska (Northwest Arctic and North Slope Borough jurisdictions) and resilience. This regional focus was oriented towards overall health and sustainability in these boroughs'

communities, but within this project the surveys included specific questions about education. I wanted to know: *What role does education play in developing resilient communities for this portion of Alaska?* Education was frequently discussed both as a formal compulsory process but also as an Indigenous process connected to learning language, cultural values, and skills tied to subsistence, travel, and safety on land or waters. Both are viewed as needed for success in the region, which is a mixed-subsistence economy and has greater job opportunities in the hub cities (Utqiaġvik, Kotzebue) than in remote locations. The final key factors cited by participants who make up resilient communities are based in a wide range of social learning, tied both to schools and to culture and living on the land.

Chapter 6 Arctic Futures Makers posed the question, *How do high school students in Arctic Alaska, the Northwest Arctic Borough specifically, understand the future and their own resilience?* In this chapter I sought to understand individual factors of resilience and how youth from this region, as a group, understand and relate to the future of their communities. In terms of the former, what factors keep an Indigenous high school student in a small community focused on his or her education? Considering how scenarios development workshops as social learning can be a valuable tool for expanding adaptive capacity, I surveyed student participants with questions asking what helps them to be resilient in order to succeed, given the challenges documented in chapters 3, 4, and 5. At the group level, my goals were to compare the capacity for imagination and production of key factors by students' results to the adults' results from the NASProject (chapter 5). This was perhaps the most challenging aspect of analysis of my fieldwork data; it involved using both individual and group data as well as planning, implementing, and reviewing a two-day workshop in Kotzebue with high school students from

every community in the Northwest Arctic Borough. In this chapter I discuss the lessons learned from the undertaking, which should be considered in terms of an exploratory project.

Chapter 7 Learners to Leaders: Findings and Recommendations is my concluding chapter. I find that IK systems should be taught as an equal companion to Western knowledge in Alaska. The difficulties presented in the data on schools (chapter 3) indicate that now is the time for reform that will enable the state and its schools to create a more "place-based" approach to education. This must happen through school flexibility (chapter 4) to engage Indigenous Knowledge systems, either directly or by mandating flexible Western schooling. It must happen for both Indigenous and non-Indigenous students because at the regional level, resident experts link both types of knowledge and all kinds of young people together as vital to community resilience (chapter 5). Based on their own perspectives (chapter 6), young people themselves are living in both of these modes of learning already.

Chapter 2 The Role of Public Education in Governance for Resilience in a Rapidly Changing Arctic[1]

2.1 Introduction

Given the rapid social and climatic changes occurring in the Arctic (Young, 2010; Lovecraft & Eicken, 2011; AMAP, 2012; ARIR, 2013; Walsh, 2013), how do we create better linkages between societies and environments through governance? This question is intimately tied to the power of public schools to inform behaviors, enculturate practices towards environmental systems, and educate students with the knowledge required for decision-making – in short governance. The work of Spellman in Ecology and Society's *Pathways of Resilience in a Rapidly Changing Alaska (2015)* discusses elements of learning that are possible in social-ecological systems (SES). But how might these kinds of learning be promoted through governance? In other words, whose hands will wield "learning tools" and to what ends? This paper examines public educational systems and reviews their potential as transformative components of rapidly changing SES. I argue that the compulsory school systems of the eight Arctic nations that serve remote locations can be considered "governance agents" in the push toward Arctic resilience. This paper focuses primarily on Alaska but draws lessons from pertinent northern cases with similar demographics, history, environment, and educational policy. Alaska's lessons in Arctic resilience via education apply most readily to Canada but may also apply to northern Scandinavia and Russian, though further research is needed.

School systems, as *systems*, are an assemblage of actors, institutions, and infrastructures that form the complex whole of compulsory K-12 education in the United States. As a

[1] Cost, D.S. (2015). The role of public education in governance for resilience in a rapidly changing Arctic. *Ecology and Society*, *20*(3), 29.)

consequence, they create and maintain various forms of capital – human, social, built, environmental – that alter their social and ecological environments. Broadly speaking, the U.S. public school system acts as an agent of governments at national, regional, state, and local levels. This impact is significant when you consider it includes children and their care providers from approximately ages 5-18 for the majority of any given calendar year. As such, school systems are complex, layered "policy subsystems (Jenkins-Smith, Nohrstedt, Weible, & Sabatier, 2014, p. 189)" or "action situations" for policy (Ostrom, Cox, & Schlager, 2014, p. 272). They are a specific kind of formal learning subsystem within any given SES. Their compulsory nature, role in enculturation, and relation to government agendas make them particularly important for the study of connections between learning, governance, and resilience. The aims of this paper are threefold. First I explain how public education is a form of governance; second, I explain the role of education in resilience; and third, I propose ways that schools are, and can better be, a force for individual and community resilience in social-ecological systems across the Arctic. In short, I argue that school systems are agents of governance that can affect an individual's capacity to be resilient in the face of setbacks, and more widely a community's capacity to anticipate and respond to changes.

2.2 Schooling as Governance Defined

Why should schools be considered agents of governance? Governance is discussed differently depending on the context. Broadly,

> Governance, the structures and processes by which societies share power, shapes individual and collective actions (Young, 1992). Governance includes laws, regulations, discursive debates, negotiation, mediation, conflict resolution, elections, public

> consultations, protests, and other decision-making processes…It can be formally institutionalized or expressed through subtle norms of interaction or even more indirectly by influencing the agendas and shaping the contexts in which actors contest decisions and determine access to resources. (Lebel et al., 2006, p. 4)

Schooling and the policies that affect schooling tend to incorporate and include many if not all aspects of this definition of governance. Considered from an SES perspective, "In social-ecological systems, diversity is created through experimentation and innovation, and selection occurs through the process of *governance*—the pattern of interaction among actors that steer social and environmental processes within a particular policy arena" (Kofinas and Chapin, 2009, p. 73).

Public education has fostered experimentation and innovation, in both positive and negative directions, and forms methods and patterns through which much human-environmental discourse occurs. Schools are part of the foundation, along with family and community, from which diverse actors begin patterns of interaction with social and environmental systems. These patterns inform how adults conceptualize resilience, both individually and collectively. Thus, schools can enhance diversity among actors, practices, and institutions that can foster opportunities for innovation in SES. Schools in the Arctic are often in remote locations; in Alaska dozens are off the road systems, and many serve a large percentage of Indigenous students. This isolation and service to Indigenous populations make Arctic schools of particular importance, but they are often similar in function to many other rural schools across the U.S., in that they serve as physical and psychological meeting grounds (Comber, 2013) and community centers (Miller, 1995; Salant & Waller, 1998; Johns, Kilpatrick, Falk, & Mulford, 2000). They

host many of the interactions among actors that steer social and environmental processes (Wright, 2007; Orr, 1994).

More specifically related to the actors in environmental governance, Lemos and Agarwal (2006) describe that, "Governance is not the same as government. It includes the actions of state and, in addition, encompasses actors such as communities, businesses, and NGOs." They further depict the three major actors in environmental governance as the state, market, and community. Thus, state and community can practice "co-management," between state and market lie "public-private partnerships," and between market and community there exist "private-social partnerships" (Lemos & Agarwal, 2006, 2009). Public schools have been historically dominated by the state and its "regulatory processes, mechanisms and organizations through which political actors influence environmental actions and outcomes" (Lemos & Agarwal, 2006, 2009). Though schools do partner with community and market forces, this paper is focusing on them primarily as a government-driven component of governance, and will ultimately argue that a model approaching "co-management" between community priorities and government directives may be best for Arctic North American school systems.

Public schools are agents of governance in SES and thus capable of being transformative. In the 1900s scholars began to write about the relationship between schools and social power. Dewey explained the role public schools play in implementing governing *technologies*. Dewey's understanding that children reproduce what is taught to them, including socio-political roles, and reproduce them as an extension of their home life is a critical aspect of the political socialization of public schools. Schools begin the governance of children by strangers charged by the state with the responsibility to enculturate and educate children in the social norms of the community (Dewey, 1897). This paradigm means that negative or positive reflections of home life – culture,

attitude toward nature, class, race, ethnicity – will be addressed directly or indirectly in school and later reproduced by the children. These assertions have been supported by a range of scholars from different fields (Eliot, 1959; Greenstein, 1960; Patterson, 1960; Coleman, 1961; Key, 1961; Litt 1963). Recently, Popkewitz further emphasized that education, curriculum, and pedagogy are extensions of state governance.

The coupling of stable disciplinary knowledge with the individualization processes of pedagogical knowledge causes the purpose of teaching to become governing youth. Teachers assess and administer student's conceptions (or changing misconceptions) of school subjects. The governing principles in the rules of problem-solving structures of the curriculum go unexamined. What is perceived as children participating in their constructions of knowledge is in fact youth participating in historically derived systems of reasoning that are themselves the unacknowledged effects of power. (Popkewitz, 1998, p. 552)

Figure 1

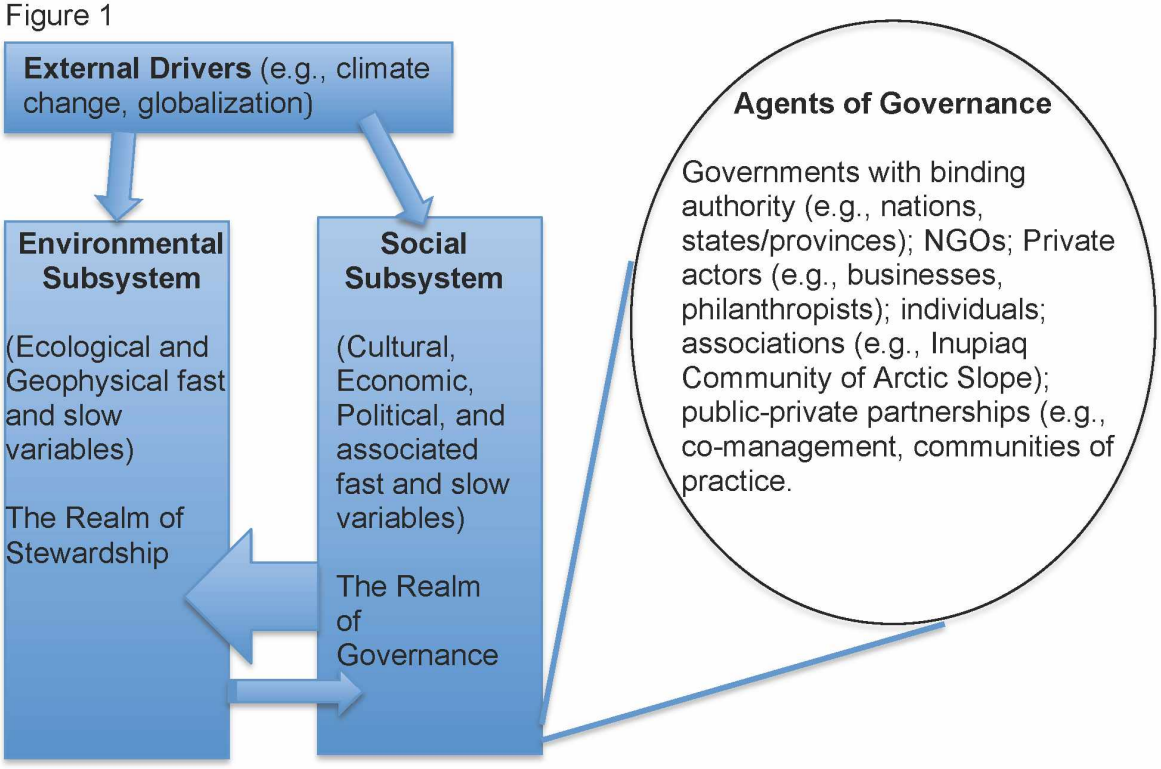

Figure 1 Social-ecological System (SES) and Governance

Figure 1 SES and Governance depicts school systems within a framework of SES that addresses governance. They require us to consider more deeply the influence of public schooling on shaping the vulnerabilities and adaptive capacities of community members to address external drivers such as rapid economic development or climate change.

Although generally overlooked in SES analysis, public schooling has been influential in how Arctic communities have been governed. A brief review demonstrates this point. In Alaska, Canada, and other Arctic regions, public education was initially often a tool for efforts to subjugate Indigenous populations (e.g. the Inuit, the Saami) and forcibly govern them through assimilation policies. The introduction of Western schooling in the Arctic was largely a negative influence (Kawagley, 2006; Darnell & Hoem, 1996; Todal, 1999; Barnhardt, C., 2001; Rasmussen, 2001) and many still perceive Western schooling as a negative influence on communities in spite of efforts at change (Jester, 2002). Education systems have served as agents of governance by compelling people to attend school, physically relocating people, instructing

students on correct social behaviors, eradicating languages and disconnecting continued capacity for connection to the land and ecological knowledge. Barnhardt, C. (2001) summarizes the negative examples of schools in governance for Indigenous peoples.

Schools are agents of the dominant society and as such, they reflect the underlying cultural patterns of that society. As long as they reflect the structure and social organization of the dominant society, they can be expected to perpetuate its values, attitudes, and behavior patterns within an implicit framework of assimilation (Barnhardt, R., 1981, p. 2). Governments utilized the public school system to govern Indigenous peoples and to simultaneously disperse their capacity for political power. Furthermore, school policies and curricula often disrupted the capacity of the people to develop, practice, and pass on Indigenous Knowledge (IK) as well as a vital suite of other traditions, practices, and values. The public school system did damage not only to social sustainability but also disrupted the capacity of the people who had been the main bearers of knowledge about the Arctic environment to pass on their learning and IK to their descendants, thus weakening environmental stewardship practices. For example, language eradication practices are destructive not only to social cohesion and individual identity but also to the repository of environmental wisdom (Maffi, 2005, 2007) that could be drawn upon in times of disruption or change. Systematic efforts to destroy and redirect Indigenous ways of knowing also meant a diminishing of environmental practices and attitudes by people adapted over millennia to live in the far North (Barnhardt, R., and Kawagley, 2005; Gerlach, Loring, & Turner, 2011). This process, however, did not have entirely negative outcomes if one considers the necessity for Indigenous people to learn to navigate the new multicultural Western systems of education, politics, and social-cultural activities that would pervade their lives. Educational practices, as this article stresses, enculturate. Many Indigenous

activists and leaders of today are able to participate and contribute effectively in both knowledge systems in part due to their Western education.

2.3 Inextricable Link of Education and Resilience

Resilience generally refers to the capacity of an individual or community to cope with stress, overcome adversity, and adapt positively to change (Kaplan, 1999; Varghese, Krogman, Beckley, & Nadeau, 2006). It is important to consider that education is an ongoing process that equips individuals with the capacity and learning necessary to be resilient in the face of stress, change, or perturbation (Tidball & Krasny, 2011). Olsson, Folke, and Berkes (2004) argue that because of incomplete data on ecosystems and the inability to achieve a perfect state, adaptive management, experimentation, and innovation are the keys to successful enhancement of resilience. Diversity and knowledge networks are integral in the problem-solving and critical feedback stages of SES assessment and management. In particular, adaptive management for resilience in a system is information- intensive and relies on "functional groups of social memory" (Olsson et al., 2004). Schools *are* groups of social memory; the question is how well they function.

As schools, both local and boarding, often stripped Indigenous peoples of their education and languages, knowledge and wisdom about the environment and its stewardship were lost. The generational disconnect and physical removals from traditional learning environments were detrimental to the resilience of rural Alaskan communities across many dimensions (Hirshberg, 2008). Loss of observations, livelihoods on the land, skills in traditional practices, familial and community relationships, and inherent and spiritual connections to land and ocean all contributed to the loss of valuable knowledge passed down through the generations of Indigenous peoples

(McLean, 1997). More recently, McGregor's (2010) work on cultural assimilation in the Canada shows the negative impacts that residential schools had on the necessary skills for survival and learning that previously took place within extended family member arrangements. The responsible behaviors towards the environment were taught in the Inuit traditions through their own system of education. Once the Indigenous educational system was usurped by the national Canadian system, these stewardship themes were neglected and, in the cases of residential school separation, sometimes never taught (McGregor, 2010). As noted earlier in this paper, education is governance. While I have highlighted the negative aspects in order to press the point that resilience has been diminished, Western education and knowledge have also contributed much to some Indigenous peoples' expertise, work, and impact in their communities and beyond. The education imposed on Indigenous people in the Arctic, for those who navigated the system successfully, has provided them valuable skill sets to function in an altered social-ecological landscape.

When the importance of adaptive capacity to resilience is reviewed (Folke, Colding, & Berkes, 2003) we must consider current public school practices. Most public school systems tend to focus on static measures of knowledge, such as punctuated standardized tests, rather than acknowledge that the process of education itself can cause certain qualities to be present or absent in a person. However, there is a recent movement within educational studies to value what schools can offer individual students in terms of resilience skill sets, which Henderson calls "internal protective factors that foster resilience" (e.g., relationships, self-motivation, perceptiveness, creativity, perseverance) (2013, p. 25). Education and governance are thought of as separate components of promoting resilience, but I argue that public education is governance that has the capacity to create poor or effective stewardship of an environment and thus the vital

ecosystem services provided to society (MEA, 2005). Public schools are actors that shape both social and environmental processes in communities through their organizational relationships with other social actors to secure their own ends – the enculturation of generations of students, as well as goals situated in multiple policy areas (e.g. local taxes, food provision in schools, after school activities). As noted above, the public school system as a tool of governance can be destructive and detrimental, but it also has the potential to be productive and creative through "good" governance. If education can lower SES resilience, it can also positively affect resilience. If governance to assimilate and enculturate through schools can produce tragic outcomes, then we can take seriously the proposition that good governance can provide for better social-ecological outcomes. School systems can be a tool for promoting a suite of positive behaviors towards terrestrial and marine systems through shaping attitudes and activities in relation to the natural world. This is most likely where schooling's goals, outcomes, and corresponding assessments can be directly informed by community-level adaptation needs.

In the Arctic, and in particular in other locations with school systems that serve rural and Indigenous populations (e.g., New Zealand, Australia), making connections between schools, adaptive capacity, and resilience requires the input of both Indigenous knowledge systems and Western scientific methods in order to produce new generations with adaptive skills. Multiple sources demonstrate the power of Traditional Ecological Knowledge (TEK) or IK to effect environmental stewardship (Gadgil, Berkes, & Folke, 1993; Berkes, Colding, & Folke, 2000; Turner, Ignace, M.B., & Ignace, R., 2000; Hunn, Johnson, Russell, & Thornton, 2003). As IK is being used successfully in the co-management of many environmental systems, this leads one to ask why would it not be productive in educational systems? As noted earlier, schools are politicized and publicized environments that in rural locations often serve as "the glue that binds

together small communities, serving as their economic and social hub" (Jimerson, 2006, p. 5). The inclusion of diverse ways of knowing, in particular Indigenous ways of knowing in Arctic communities, can enhance resilience. Education prepares students for uncertainties in social-environmental systems as different types of curricula shape how students learn to problem-solve, to value natural capital, and to relate environments to economic and cultural systems. There is no uniform definition or plan as to how this would happen from location to location. School personnel need training in modes of adaptation and resilience locally incorporating both IK and Western science.

Researchers have begun to catalog both individual and community-wide results in terms of students and resilience. Benard, summarizing a decade of longitudinal studies on factors fostering resilience in children, defined resilience as "a term used to describe a set of qualities that foster a process of successful adaptation and transformation despite risk and adversity" (Benard, 1995, p. 2). Bergstrom et al. (2003) examined factors that fostered resilience in Native youth, from the United States and Canada, and found across 120 interviews that common connections to parents, community, teachers, and schools constituted major contributors to resilience. In addition, a large majority of the youth cited connection to their culture as a key factor. Grounded-ness in home culture enabled confidence in crossing between home culture and school culture. These Native youth also cited participating in a school curriculum that included their Indigenous culture, history and language as a source of resilience for these Native youth (Bergstrom, Cleary, & Peacock, 2003). These definitions of resilience specifically address the human in a SES, rather than simply applying a biological concept of resilience to human behaviors. And what else does governance target but human behavior? At the community level, Wright's (2004, 2007) work in New Zealand and her extensive review of other cases of rural

schools has demonstrated the power of such schools to reenergize communities and to serve as community social hubs that can positively affect adults as well as children. She notes the "inextricable linking of a school with its community not only allows, but also actively encourages social connectedness…the school's inseparability from its community ensures not just the school's survival, but the community's survival as well" (2007, p. 355).

2.4 The Resilience- Governance Connection

The history and future of government influence on schools is ideally progressing through three "R's": religion, reason, and resilience. In the earliest days of formal public education in North America, schools and curricula were built around religious ideals to provide a moral education for students along with basic subject material. In the 1910s and 1920s in America, the economy became the emphasis of governance in preparing students for future work, which meant their rational faculties were brought to the fore and reason dominated curricula. Given the rapid social and environmental changes at high latitudes, many ask how we might move to a third R: resilience. If learning can enhance resilience at the individual and community levels, then why could schools not consciously be used to teach and learn for resilience outcomes?

Olsson et al. (2004, p. 75) argue that in most social-ecological systems "successful adaptive approaches for ecosystem management under uncertainty need to (1) build knowledge and understanding of resource and ecosystem dynamics, (2) develop practices that interpret and respond to ecological feedback, and (3) support flexible institutions and organizations and adaptive management processes." Public schools are a source of each of these aspects. First, schools are part of a process of governance that teaches, provides learning, experimentation and experience to people and creates a store of problem-solving knowledge from which to draw (e.g.,

production of citizens, enculturation of ideas about nature). Second, schools create learning and experiences that promote or prevent the understanding of students in relation to activities based in dynamic ecological knowledge (e.g. keeping kids out of hunting or allowing flexible schedules for whaling); and they can serve as institutions that adapt to a constantly changing environment. Third, the provision of education can create informed and thoughtful people with coping strategies. This requires both attention to solving the problems facing schools across North America (e.g., keeping students in schools, the fact that males are falling behind) and actively collaborating with local communities to create place-based curricula. It is this combination of knowledge, environmental subjectivity, and flexibility that can prepare students for the uncertainties that may arise in SES.

Second, Lebel et al. (2006) note three attributes of governance that function in society to enhance the capacity to manage for resilience:

> (1) participation builds trust, and deliberation leads to the shared understanding needed to mobilize and self-organize; (2) polycentric and multilayered institutions improve the fit between knowledge, action, and social-ecological contexts in ways that allow societies to respond more adaptively at appropriate levels; and (3) accountable authorities that also pursue just distributions of benefits and involuntary risks enhance the adaptive capacity of vulnerable groups and society as a whole (Lebel et al., 2006, p. 1).

Public schools encourage diverse participation in that they purport to be all-inclusive, especially in the context of remote rural schools where there is generally no alternative. Schools can be sites of and for deliberation and are currently a passive part of resilience because of the trust, participation, and communication inherent in the school system. Secondly, a school system itself is a polycentric and multilayered organizational system in its multiple classrooms and different

learning environments. School systems also engage multiple levels of governance as hosts and participants. These relationships have the capacity within many of the negotiations transacted in the SES to affect formal and informal rules. Thirdly, empowering local school boards, community members, and stakeholders to hire leaders and teachers willing to enact a combined vision of local and global priorities ensures a level of accountability and justice that again can further resilience of schools systems and SES's. Public schools do or can meet these criteria though the role is often not formally recognized. They have a direct hand in the development and enhancement of well-being and diverse coping strategies within a community and can capitalize on the enthusiasm of the community's youth to be integral players in the process.

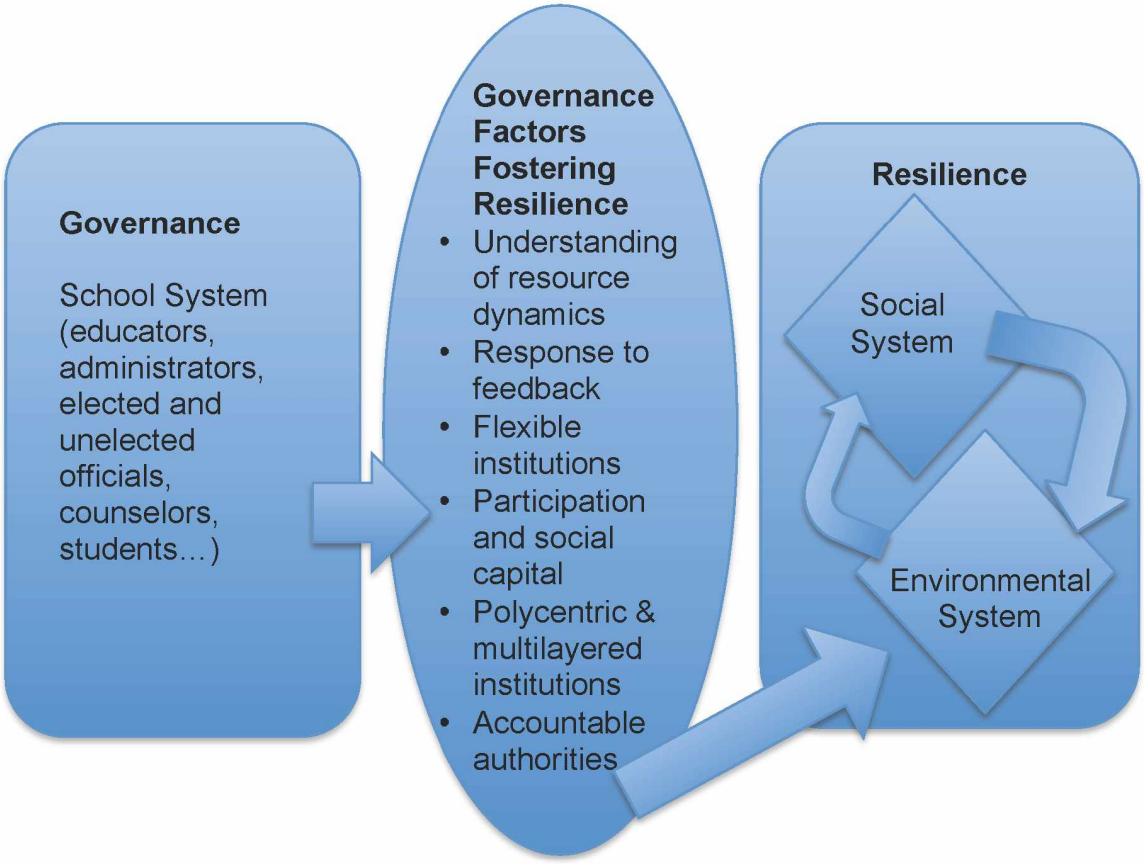

Figure 2 Schooling as Governance Impacting Resilience

In **Figure 2 Schooling as Governance Impacting Resilience**, two suites of requirements for resilient outcomes are used to build the school system variables. Fig. 2 also depicts how these six key variables within a school system can result in higher or lower resilience in its social-environmental system.

2.5 Designing Systems for Northern Adaptation

As we apply the resilience concept to school systems we must be aware that many school systems have also been resilient in negative ways (i.e., maladaptive) due to institutional reiterations of hegemonic hierarchical systems, retention of poor teachers, and inflexible standards. Such ossification in a system can spill over into communities resulting in students less likely to effectively navigate their life-paths. Consequently, school systems must be positively

adaptive to foster resilience. Dewey wrote in 1897, "I believe that education is the fundamental method of social progress and reform." Furthermore, he argued that

> … much of present education fails because it neglects this fundamental principle of the school as a form of community life. It conceives the school as a place where certain information is to be given, where certain lessons are to be learned, or where certain habits are to be formed. The value of these is conceived as lying largely in the remote future; the child must do these things for the sake of something else he is to do; they are mere preparation. As a result they do not become a part of the life experience of the child and so are not truly educative (Dewey, 1897, p. 8).

Dewey over a century ago captured the essence of the disconnect for students, who are also future stewards of the earth and its processes. Without the connection to community life, culture, and Indigenous Knowledge, the value of what is being imparted to students in the classroom has the potential to be lost on them. The "future" and its skill sets standardized by state and federal priorities for schools is often an unlikely future in the context of remote rural Arctic locations.

Through incorporating place-based and culturally identifiable aspects in school, education could create connective life experiences for students. How can this form of education be incorporated into governance? Indigenous knowledge (IK), local knowledge (LK), and place-based learning programs have all been demonstrated to foster resilience to an extent. From the Western point of view in power, Indigenous knowledge is often thought of as a cultural process while Western education is often thought of less as a cultural process and more as "neutral" learning, even though both enculturate. It is all a matter of perspective, the problem being that the Indigenous person's perspective is not often heard, weighed, or valued. Both forms of education teach approaches toward nature. Language revitalization efforts in Alaska and Canada

are also forms of place-based and land-connected learning (Raffan, 1993; Krupnik & Jolly, 2002; Semken, 2005).

Bohensky and Maru survey a decade of literature specifically addressing the integration of Indigenous and Western knowledge. They argue that although there are many efforts and a valid theoretical basis for the integration of TEK and Western science, there is a lack of strong empirical data evidencing their productivity for enhancing resilience. However, they note that resilience stresses the need for "novelty and innovation in human interactions with the world, based on different knowledge systems" (Bohensky & Maru, 2011, p. 11). Novelty and innovation are key elements in the process of knowledge integration; these are also foundational to resilience as "knowledge identities are maintained, but enriched through interaction with one another" (Bohensky & Maru, 2011). In sum, currently there is limited data that the actual integration of knowledge systems causes resilience, but the data does support that the process of integrating knowledge systems enhances an individual's skill sets. These skill sets can feed into community resilience. In fact, simply the grappling with two different knowledge sets has value (Seidman, 1986; Kawagley & Barnhardt, R., 1998).

Place-based schooling while touted for its capacity to foster environmental awareness (Gruenewald, 2003; Sobel, 2005), is not often discussed as a tool of resilience, but it can be. Wright notes that communities "must be resilient to be sustainable. Resilience results as relationships among community members develop" (Wright, 2007, p. 348). In this sense all place-based education promotes better understanding of one's community, one's social-ecological system, and resists the monocultural tendencies of standardized education that often have negative impacts on Indigenous youth (Jester, 2002). "By using the local ecological and sociocultural setting as the organizing focus, place-based education aims to reestablish

connections among schools, youth, and communities that have disintegrated in conventional schooling" (Wright, 2007, p. 256). Place-based schooling and local influence/control over schooling are both constructs to better inform education, curriculum, and programs to prepare students to be self-sufficient, resilient and personally fulfilled individuals who contribute to the SES.

Wamsler, Brink, & Rentala's (2012) research shows improved resilience from increased local education in Brazil and El Salvador. Those living in the lower socio-economic enclaves of two case-study cities and learning in schools that were focused more on the community were better prepared to be resilient in the face of environmental catastrophe than those not in community-focused schools. Furthermore, respondents with more years of formal education were better equipped with the skills to interface with organizations that facilitated resilience, and this additionally prepared them to speak more easily with authorities like the police or medical personnel (Wamsler, Brink, & Rentala, 2012). "Place-based" schooling that is the usual suspect for SES resilience is correlated with resilience, but so is simply more education.

Nicol, Archibald, and Baker (2013) profile a program on the Pacific Northwest coast of British Columbia that relied on teacher innovation and collaboration to find more Culturally Responsive Education (CRE) pathways to teach math to struggling students. CRE requirements of its teachers and students were: inquiry-based critical thinking, valuing diversity in thinking, understanding and problem solving, and a requisite of social consciousness and personal/collective agency. The teachers used place, culture, and connection to build math curricula and lessons. These methods demonstrated that the experiences, knowledge, and culture that students brought to the classroom were valuable and valued. The verdict is still out, as the few studies on CRE are in disagreement as to contributions to educational outcomes. The

difficulty lies in the fact that standardized government assessment measures often do not measure aspects like cultural, personal, or Indigenous resilience but rather the discrete set of skills set forth in the test instrument. A resilient ecosystem relies on resilience-minded actors who critically think and problem solve in a particular ecosystem context – this is generally not what standardized assessments measure.

2.6 Potential Capacity of Education to Impact Resilience

School as a form of governance has often been detrimental to the marginalized and colonized around the world. How, when thinking about it as a form of governance, can it be transformed to better fit the needs of those it serves and to continue to govern? Schaull notes in the foreword of Paolo Freire's *Pedagogy of the Oppressed* (2000):

> There is no such thing as a neutral education process. Education either functions as an instrument that is used to facilitate the integration of the younger generation into the logic of the present system and bring about conformity to it, or it becomes the 'practice of freedom,' the means by which the men and women deal critically and creatively with reality and discover how to participate in the transformation of their world (Schaull, 2000, p. 34).

Presently public education in the U.S. and Canadian High North has ameliorated some of the worst aspects from the boarding school and Indigenous language extinguishment period with novel and increasingly effective efforts to include Indigenous ways of knowing in classrooms (Lipka, Mohatt, & the Ciulistet Group, 1998; Barnhardt, R. & Kawagley, 2005; Nicol et al., 2010). The Alaska Rural Systemic Initiative (AKRSI), established in 1994, was one of the first and most significant examples of an initiative working to integrate knowledge systems to benefit

all Alaskan students, not just Alaska Natives. AKRSI's purpose was "to systematically document Indigenous knowledge systems of Alaska Native people and develop instructional practices that appropriately integrated Indigenous knowledge and ways of knowing into all aspects of education" (Barnhardt, R., 2013, p. 1). In part born from this effort, multiple programs related to combining methods with Western mathematical principles are being used in Alaska with one that has demonstrated some success being tied to Yup'ik math modules. Rickard (2005) demonstrated that lessons on "how to build a fish rack," when studied in 6th grade, resulted in higher test scores among those who participated in the "Math in a Cultural Context" module than the control group; and Alaska Native youths also scored higher than the control. Demonstrated success is inconsistent in implementation and documentation since soft funding, turnover, and lack of pragmatic application from researcher and policy originations deleteriously affect program longevity. The attempts and minimal results are promising although none are fully realized; this further supports a more systematic examination of the role public education systems play in contributing to resilience across scales.

Schools can facilitate students' capacity to understand complexity and respond with flexibility to challenging situations at the individual level. They also can develop students' capacities to envision and imagine alternate futures through the use of simulations and scenarios to explore possible outcomes across all disciplines employing collaboration and technology (Mietzner & Reger, 2005; Jones et al., 2011; Tidball & Krasny, 2011). This in turn, due to the vital role played by rural schools, can enhance community resilience. In fact, studies (Haas & Nachtigal, 1998; Johns et al., 2000) indicate the power of using the community as the curriculum. A recent example that ties together the threads of risk reduction, community resilience, public schools as community hubs, and innovative SES governance is the case of Tok,

Alaska. In 2008, after decades of intense wildland fire activity threatening Tok, a village on the Alaska Highway of approximately 1,200 people, the community undertook a major effort to thin the stands of black spruce surrounding its buildings. In brief, the village is "unincorporated," meaning it has no borough or municipal governments; it also has high unemployment (a large majority of the workforce is unemployed in some seasons) and the cost of energy to heat buildings is high with heating oil costing over $4/gallon. Through a series of community meetings it was decided to first thin trees around the school first. Then, through strong leadership, a plan was developed that tied the thinning of trees to heating the school (Hermanns, 2013). The school purchased a biomass boiler with help from a state grant to convert the trees into heat and by 2013 the school district was saving $350,000 annually on electricity and heating costs (Hillman, 2014). The energy savings went into hiring local people to thin trees and to train to become firefighters. It now also heats a commercial greenhouse growing vegetables to feed the school's students, and the school has also been able to hire a music teacher and counselor (Hillman, 2014). The entire biomass infrastructure sits on the school grounds. Good forestry and Firewise practices, a grant-funded program that reimburses residents taking responsibility for preparing and mitigating for the risks of potential wildfire (Hermanns, 2013), are important concepts in the school curriculum. The greenhouse continues to be a source of learning about indoor agricultural practices and nutrition and has demonstrated the school's willingness to experiment and innovate (Hillman, 2014).

Nonetheless, the challenges and obstacles rural school systems face in implementing innovations to curriculum and school systems are numerous and nearly monolithic. There is no comprehensive curriculum in use in remote, largely Indigenous, school systems that is integrative and not entirely standards-based, though the North Slope Borough School District

(NSBSD) is trying to move in that direction. The school system works from the top-down in order to instill consistency and equality across the state educational system. This methodology presents problems because the United States and Alaska are complex systems with a multitude of perspectives and environments in which "one size fits all" does little to acknowledge change or the adaptive capacity an Arctic SES might require. School as a form of governance balanced by local and global priorities and inputs is especially important in cases of the rural Arctic where communities do not look much like the communities where the rules or guiding principles are developed and enacted (e.g., Washington DC, Ottawa). The key aspect is genuine integration of local and indigenous knowledge, learning and contexts into the educational system as a whole (see discussion of self-determination in Chapter 4.

There is no single set of key factors in rural Alaska that impedes the development of resilience-based teaching practices in adaptation-oriented school systems, just as there is no uniform list of resilience practices that can create adaptive schooling across the Arctic. However, the two major current impediments stem from a suite of interactions of federal and state policies tied to No Child Left Behind (NCLB; McDonnell, 2005), and to high school personnel turnover. The NCLB interactions affect English language learners (Menken, 2006), exacerbate economic and racial inequalities (Hursh, 2007; Darling-Hammond, 2007), and conflict with community priorities (Goetz, 2005). These combine to hinder the enactment of more culturally sensitive, place-based, linguistically flexible, Indigenous, resilience-based, and rurally focused school programs. In fact, Alaska received a waiver in 2013 to opt out of the major provisions of NCLB as the state develops its own system of student performance to "incorporate data that includes but goes beyond test scores to present a more accurate picture of the health of our schools across the state" (Hanley, 2013). This was an example of a state with significant rural and Indigenous

populations recognizing that its educational system can create a more holistic process of assessing student success. Alaska was not alone: at the time at least 36 other states opted out of portions of NCLB. Furthermore, this response demonstrates the resistance coming from lower levels of governance to increase community input and better address needs from students' learning perspectives. The Every Student Succeeds Act (ESSA) has the potential to shift the centralized high-stakes school accountability system towards more local control and more appropriate and comprehensive school assessment measures.

Combined with national regulations, another feature of remote schooling is high teacher and administrative turnover that destabilizes educational pathways. Recruiting and retaining school personnel has become a vital and pressing concern because rural districts average 20% turnover per year (Hill & Hirshberg, 2013). This conservatively costs the state of Alaska $20,000 per teacher or $20 million total per year with 1,000 teachers leaving each year (Defeo, Trang Tran, Hirshberg, Cope, & Cravez, 2017). High personnel turnover significantly reduces schools' ability to develop locally grounded resilience curricula and stable community partnerships. Enhancing the recruitment and training of Alaskan or even just Arctic Alaskan teachers and administrators might answer the call of the National Indian Education Association of the need for "culturally based education as it relates to the development of culturally appropriate education pedagogy and curriculum that reflects the social cultural and linguistic heritage of the Native communities" (Beaulieu, 2005, p. 5).

Additionally, many rural school sites in Alaska face dwindling student populations; at fewer than ten students, a school is closed down altogether. Since the minimum number of students was increased from eight to ten, twenty-seven rural schools in Alaska have shuttered their doors (DeMarban, 2012). Indigenous students drop out at higher rates and demonstrate

lower achievement on standardized measures than their peers (Hirshberg et al., 2014). Rural schools also struggle to offer the breadth and depth of educational opportunities that their larger counterparts offer students. Two other consequential obstacles to sustaining educational change in rural Alaska are inconsistency of leadership at all levels, and funding of school programs. Such system-wide factors provide opportunities for change, innovation, and experimentation upon which resilience is constructed – but a *consistent* will to address them with durable funding has yet to be established.

2.7 Conclusion

Schools can be and have been the heart of community activism, action, and collaboration. Because schools in rural Alaska have often been in place for decades, have some dedicated funding, persist in providing routinized schedules, have the backing of multiple levels of government, and serve as community touchstones they offer stability in a rapidly changing social-ecological environment. Public schools have the capacity to contribute to their communities with leaders in place who are interested (Johns et al., 2000) in the fruitful combination of student success through learning via resilience and broader community-wide engagement. Schools offer an approach of governance that has the power of action in communities; in particular this can be the case when there is a vacuum of coordinated governance from other community sources. In village and rural communities, where climate, environmental, and socio-economic changes have the greatest impact, the public school is a stable, functional social institution that could be haven for innovation and deliberation. Although currently mostly externally controlled, schools can become "co-managers" in a community's future rather than reactive forces reacting to standardized policies from remote locations.

Co-management formalizes the relationship between state and community. This partnership already exists, but I suggest a broader and more impactful role for community in it. As the Tok example demonstrates, schools are important to their communities and can be deeply connected to ecosystem services. If this partnership is taken seriously, schools could serve as sources of resilience for the local SES to fall back on in times of volatility or uncertainty. As students are trained in adaptive strategies within the organization of the school, they are more likely to apply those strategies in their work, home, and daily lives in the community SES. In addition, schools can be the settings where scenarios or decision-making exercises might be played out with lesser stakes, fostering experimentation.

In other words, schools could facilitate linkages among village populations, agencies, Alaska Natives, scholars and others to develop individuals and organizations as advocates for many forms of resilience, including ecological, economic, cultural and individual or student learning resilience. A new focus on critical thinking and problem solving in schools and preparing students to use knowledges flexibly is in fact creating more resilient individuals. It facilitates access to suites of knowledges about subjects they can apply to various problems in life, as well as facilitating multiplicity and variety in the knowledge contained in the curriculum. This is resilience thinking generally, prior to demonstrating resilience-enhanced outcomes more specific to environmental problems. Education also promotes social-environmental resilience through entraining young people in attitudes and skills tied to stewardship practices so that the youth of today can make informed decisions about their environments into the future. These practices can exist in both Western and Indigenous educational systems. Schools as representative microcosms are uniquely poised to explore decision-making, scenario development and collaboration in a way that could inform the system on a larger geographic and

temporal scale. The potential influence of schools and education as powerful future agents of resilience and transformation is great.

Why would we benefit from thinking about schools as a form of governance? The approach is straightforward and allows us to think more systematically about the systems governing us and our interactions with the environment. This approach has the capability to produce governance that is resilience- and sustainability-based around strategies that foster problem solving, critical thinking and resilience that respect both Indigenous Knowledge and innovation. If we can recognize that we govern through our school systems, maybe we will have a better chance of positively transforming Arctic social-ecological systems, schools, and students.

Chapter 3 Overview of Alaska Education

3.1 The Historical Context of Alaska Native Education Today

The central question posed by my dissertation is: How can public education in Arctic Alaska foster individual and community resilience in a time of rapid social-environmental change? This chapter performs only minimal analysis and is designed to focus the reader on the attributes of the formal compulsory educational system in the State of Alaska by way of the United States' legal relationship with its Indigenous peoples. It also links this system to the modern formal concept of "self-determination" that grew out of the 1972 Indian Education Act. It is an important piece of the dissertation because it demonstrates how the compulsory education system in the U.S., and Alaska, affects Indigenous schoolchildren, and of course, their communities. The persistent problems in the Alaska education system, particularly for rural areas, of turnover, lack of accountability, lack of appropriate content and delivery, and poor communication among teachers, administrators, and others are key themes that inform all the other chapters.

The system developed in the U.S. for Indian Education can be traced to the more than 100 treaties that the U.S. made with the Indigenous nations regarding provisions for educating Indian children. Before these treaties and continuing after, missionaries were the principle agents involved in the westernized education of Indian children. As noted in chapter 2 the missionaries founded boarding schools. These were the first systematic governmental technique to assimilate Indian children into the dominant white culture. As these boarding schools gained popularity in the 1700s and 1800s, it was apparent that these schools contributed to a "breakdown of tribal

culture, alienation of Indian parents from the education of their children, and emotional, psychological, and mental anguish" (Deyhle & Swisher 1997, p. 114).

During national education reforms of the early 1900s, many Native American children were moved from boarding schools, to day schools, and eventually to public schools. Although depending on which region of the country one's tribe was located and the American obsession with skin color tied to the system of segregation, the public schools that these children attended and the schools' qualities can be difficult to research. Though some children remained in boarding schools and Bureau of Indian Affairs schools, the majority of the children were now in public schools. The approaches regarding public school systems in relation to Indian education varied throughout the decades alongside the dominant settler cultural legal approach towards America's Indigenous peoples. The initial "government to government" arrangement of the Founding crumbled under violence and western expansion as witnessed through the Marshall Trilogy that ended with the Trail of Tears and subjugation on reservations. Next, the Dawes Act 1887 and its "defeated nation approach" led to a grant of citizenship to all Native Americans. This legal status was both positive in permitting voting and other citizen privileges, but also problematic as another effort at assimilation. Then the Indian Reorganization Act of 1934 (applying to Alaska in 1936) tried to handle the "Indian problem" in terms of lands and status differently. This latter act represented a period when schools moved to focus on culturally appropriate curricula, however these efforts were never fully implemented due to the onset of WWII. The next several decades saw new ideologies of the role of the "Indian" with the process of termination in the 1950s wiping out much of the gains reservations had over their civil and criminal jurisdictions and rolling back culturally appropriate education that was cut from federal programs. The societal "revolutions" and identity politics wrought through the Civil Rights

Movement also created a movement to bring back Indigenous cultural expression into the classroom during the 60s and 70s. However, in the 1980s the development of federal controls of uniformity expressed through standardized testing began to spread (Deyhle & Swisher, 1997; Lomawaima & Tsianina, 2002).

The role of states' dominance in education began to be questioned by the 1990s. But, the sweeping 2002 education legislation No Child Left Behind (NCLB) is in fact a problematic reauthorization of the 1965 Elementary and Secondary Education Act (ESEA) which itself was an enormous piece of legislation with a focus on helping different populations across the U.S. who had been struggling in the different state school systems. The 1972 Indian Education Act (IEA) was an amendment to the ESEA and created several committees dedicated to bettering Indian education and funding Indian education programs in public schools. It addressed the population including Native Americans, Alaska Natives, and Native Hawaiians, who according to the ESEA had been falling behind. The Indian Education Act of 1972 specifically addressed this population through providing additional funding for Indian education programs and acknowledging that, "American Indians have unique, educational and culturally related academic needs and distinct language and cultural needs" (IEA, 1972). The IEA was remarkable for another reason; it led, in part, to the 1975 Indian Self-Determination and Education Assistance Act (ISDEAA). This act repudiated the termination era policies and restarted (again) a trust relationship between America's Indigenous peoples and the U.S. government. Alongside a variety of contracting and other special programs designed to restore a special relationship between Indigenous peoples and the federal government, it also meant Native Americans could operate their own schools.

> The Congress declares its commitment to the maintenance of the Federal Government's unique and continuing relationship with and responsibility to the Indian people through the establishment of a meaningful Indian self-determination policy which will permit an orderly transition from Federal domination of programs for and services to Indians to effective and meaningful participation by the Indian people in the planning, conduct and administration of these programs and services... (ISDEAA, Sec.3. (b))

3.2 An Overview of Arctic Alaska

The creation of and resistance to the No Child Left Behind Act 2002 (NCLB) act has created an educational context in Alaska in the last two decades that has highlighted the colonial legacy alongside strong efforts by Indigenous groups to reclaim their educational pathways. In NLCB, the Indian Education Act became Title VII and provided specific language meant to assist the development of culturally appropriate curricula for Native American children in public schools. Part A of Title VII describes that in order to "fulfill the Federal Government's unique and continuing trust relationship with and responsibility to the Indian people for the education of Indian children," four types of programs are authorized for funding. These programs should include:

1. Meeting the unique educational and culturally related academic needs of American Indians and Alaska Native
2. The education of Indian children and adults
3. The training of Indian persons as educators and counselors, and in other professions serving Indian people
4. Research, evaluation, data collection, and technical assistance (NCLB, 2002).

An exhaustive study of NCLB is beyond the scope of this dissertation; others have more extensively examined the act. In fact, the National Indian Education Association presented a "Preliminary Report on No Child Left Behind in Indian Country" in 2005 (Beaulieu, Sparks, & Alonzo). In it, the contributors include testimonies, which mention criticisms of NCLB implantation such as colonial-settler knowledge and norms in standardized testing; rigid rules; lack of simple access to funding; lack of support and respect for Native cultural thought; and shame and pressure on Indian children to be held accountable for attributes of their lives and communities beyond their control. Many contributors felt that the legislation as a whole represented a foreign model, designed from outside, that did not fit practically into Indian Country, into the modes of Indigenous thinking that exist across the U.S. But it is important to note that #4 in the funding programs above has presented an opportunity to examine questions surrounding NCLB via standardized testing results and graduation rates. The ratification of the Every Student Succeeds Act (ESSA) in 2015 will effectively push control of these processes to states and possibly to tribes in developing and envisioning how ESSA impacts public schools. What follows is a return to Alaska with an overview of Alaska's two Arctic school districts, the North Slope Borough School District (NSBSD) and the Northwest Arctic Borough School District (NWABSD) using all publically available data.

Table 2 Northern Alaska (NAK) Populations

	North Slope Borough (NSB)	Northwest Arctic (NWAB)
2014 population	9711	7774
% of AN/AI (mostly Iñupiat)	52%	79%

Alaska Department of Labor and Workforce Development, (ADL). (2015). Population estimates. http://laborstats.alaska.gov/pop/popest.htm. Accessed September 2, 2015.

The two incorporated Arctic Boroughs of Alaska are culturally similar and operate under similar borough school system structures and processes.

Table 3 Northern Alaska (NAK) School District Populations

	NSBSD	NWABSD
Number of students	2017	1850
Number of schools in district	11	13
Pupil to teacher ratio	13:1	14:1
% of students Inupiat	76-78.6%	90%
# of members on Regional School Board	7 members & 1 student representative	11 members
Total annual school district revenue (2014-2015)	$82,547,002	$78,339,091

(http://www.nwarctic.org/domain/30, https://education.alaska.gov/stats/ https://education.alaska.gov/ReportCardToThePublic/Report/2014-2015/36)

In the NSBSD, each village school has a School Advisory Council and the hub city, Utqiaġvik (Barrow), provides school administration by a superintendent, an assistant superintendent, and district office staff. In the NWABSD, each village school has Advisory School Council and the hub city, Kotzebue, provides school administration from a superintendent, an assistant superintendent, and district office staff. Finally, both school districts and boroughs have significant funding coming from natural resource extraction and are among the wealthier boroughs in the state of Alaska.

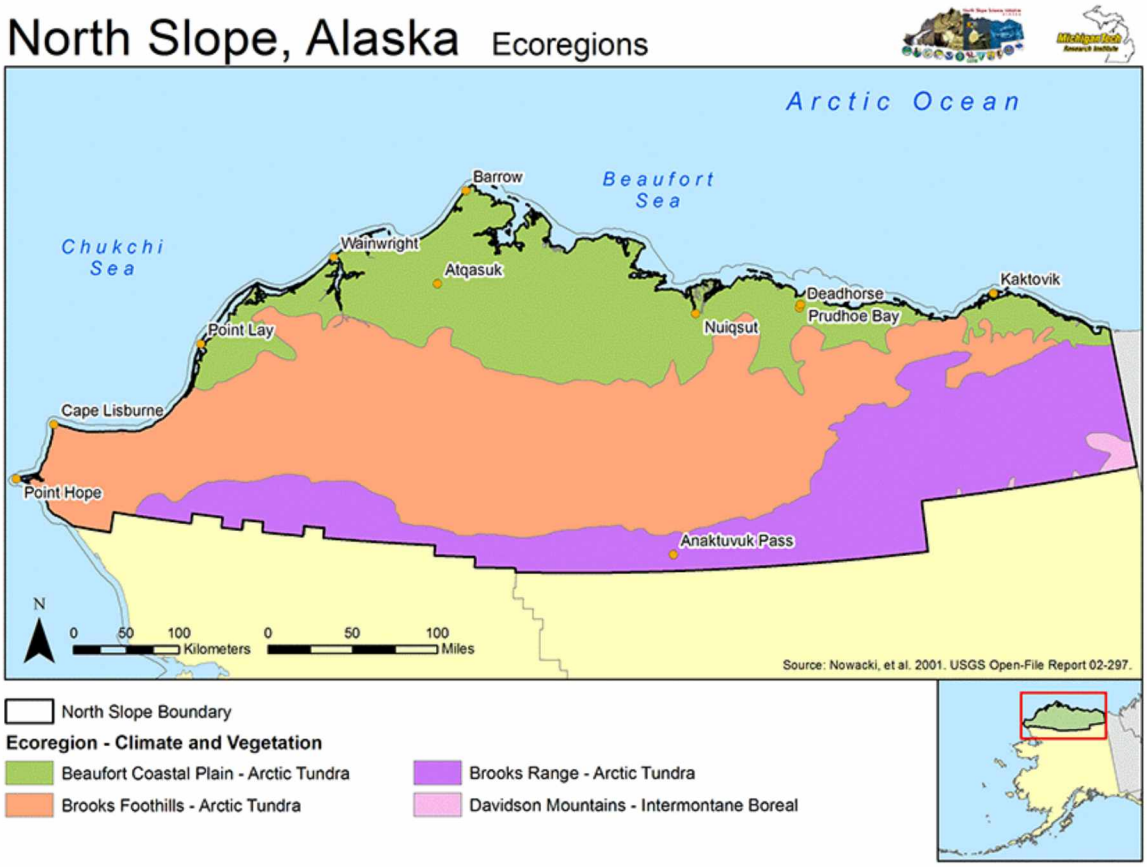

Figure 3 Map of North Slope Borough

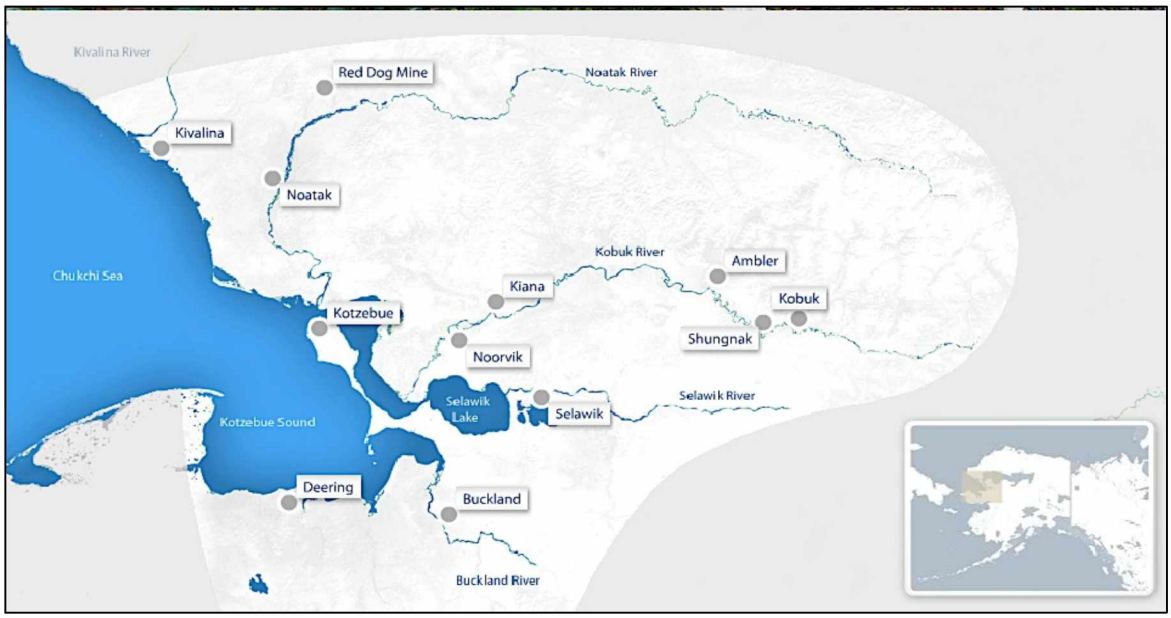

Figure 4 Map of Northwest Arctic Borough

The Red Dog Mine, a large zinc, lead and silver mine and the only source of tax revenue for the NWAB, generated $13 million in profit-sharing taxes in 2012 (Southcott, 2015). In 2013 the NSB collected $348 million from oil companies in the form of property taxes, equaling 99 percent of total property tax revenue for the year (NSSI, 2014). Although the North Slope Borough is receiving greater revenues from resource extraction, the access to this level of current and potential revenues is an aspect that draws the two boroughs together when thinking about how to diversify for future resilience and educate their youth. The boroughs are structurally similar with a hub town and many outlying villages, accessible by boat or plane and in winter by snowmachines. NSB has a hub city of Utqiaġvik (Barrow), while NWAB's commerce and transportation conduits are via Kotzebue. Another glaring difference besides tax revenue, NWAB, at 40,749 square miles is less than half the size of NSB's 94,796 square miles. Lastly the glue that should hold these two boroughs together at the futures consideration table: social-

environmental changes. Coastal erosion, sea ice decline, increased frequency of damaging Arctic storm fronts, the uncertainty of climate change are present in both alongside tensions between the maintenance of Indigenous culture, knowledge, and language and the omnipresence of Western culture especially in media, education, and commerce.

3.3 The Meaning of Schools in Arctic Alaska

Rural schools often serve as the hub of the community, where basketball games take place every evening and dances and potlatches occur over the course of a school year. The school often has the largest meeting space in the community and plays host to many important events and critical conversations. Schools in the rural communities of Northern Alaska function as a major support in the wellbeing of the community whether that is physical, psychological, health, and/or other aspects of the various factors contributing to the wellbeing of individuals and the community (e.g., a sense of belonging, lodging for visitors). In some villages, the public school building may be the only source of running water, laundry, etc. Schools host many of the meetings that impact what happens and does not happen in a community.

The importance of the community-to-school and school-to-community connection is vitally important to the wellbeing of the students, their families, and the community. Without the connection to community life, culture, and Indigenous knowledge, the value of what is being imparted to students in the school classroom has the potential to be lost on them. The "future" and its necessary anticipated skill sets, standardized by state and federal priorities for schools, is often an unlikely future of many futures in the context of remote rural Arctic locations. Hopefully, ESSA will contribute to ameliorating this gap between previous policy and public school needs.

Significant lifestyle and cultural changes of the past century make available a significant breadth of experiences that can, on one side, provide opportunities and valuable perspectives, but also can create conflict. Northern Alaska communities are demanding a balance between the revitalization and transmission of Iñupiaq language, Indigenous Knowledge and skills in a community structure and the education system that is Western in much of its rules and regulations as well as expected functions and outputs. Additionally in multiethnic communities like Utqiaġvik (Barrow) and Kotzebue, the balancing act also requires building bridges to bring together the various ethnicities in the community to participate, work, and engage; working together to build from history while not letting it dominate how the present or futures are imagined.

Although demographic shifts create powerful new opportunities for connection and collaboration, decisions about public investments, land use planning, service delivery and family caregiving are increasingly complex and challenging. Rather than assuming that communities that are good for older adults are also good for younger generations, it is important to develop community change models that intentionally engage people of all ages in collective efforts designed to benefit multiple populations, encourage alliances rather than competition for resources and promote a sense of 'shared fate' across generational, racial and ethnic differences. (Brown & Henkin, 2014, p. 67)

District-wide school boards consist of parents and local community members. The school boards review, evaluate, and adopt district and school policies within the parameters of state and federal school policies and their implementation, and define a vision for the district in partnership with the superintendent (aasb.org/clear-board-and-superintendent-roles/). The local school board also hires the district superintendent. In both of the boroughs, each school has a

School Advisory Committee (SAC). The SAC offers parents and community members the opportunity to participate in the decision-making process at their local school site. The impact that the SAC has on district-wide school boards has been mixed overall based on district leadership, vision and goals. The importance of who the school board hires to be district superintendent cannot be underestimated.

According to school district websites and outside public perception, both districts emphasize the importance of Iñupiaq learning success in conjunction with standardized Western learning success. On the ground and in schools, that emphasis tends to look and feel different depending on leadership. Again, the leadership in public education is one of the key pieces in how Iñupiaq-Western, local-global, and rural-urban integration is facilitated.

The North Slope Borough School District operates 11 schools, 4 in Utqiaġvik (Barrow), serving about 2000 preschool through twelfth grade students. In Utqiaġvik (Barrow), Iḷisaġvik College offers post-secondary academic, vocational and technical education to 1268 students designed to align with the borough and Alaska's workforce needs (Bezek, Durst, & Seider, 2015). Common goals of educational systems on the North Slope are to prepare students for future work with the employers of the North Slope. Currently schools in Utqiaġvik (Barrow) are operating at 25-50% of maximum capacity (Bezek, Durst, & Seider, 2015).

The Northwest Arctic Borough School District operates 12 schools, 2 in Kotzebue, serving over 2000 students. From the NWABSD website, the stated mission of NWABSD is "to graduate students with the skills and knowledge necessary to be good citizens," and the vision statement, "to be a leader in Pre-K-14 education based on student achievement and graduation rates." The Alaska Technical Center in Kotzebue also provides post-secondary education in office operations, building industrial technology, industrial mine maintenance and health

occupations as well as specific training needs and demands of local industry. Both boroughs have abbreviated higher education options in their hub cities, Kotzebue- University of Alaska Chukchi campus and Utqiaġvik (Barrow)- Iḷisaġvik. Although two different models, Iḷisaġvik is a tribal college and Chukchi campus is a satellite campus of UAF, the potential exists for a useful partnership between the two higher education institutions, perhaps to offer a wider complement of post-secondary choices. The Star of the North in Kotzebue is a secondary and post-secondary vocational education facility that has programs in culinary arts, heavy machinery operation, nursing, welding, carpentry, and office support training programs.

3.4 A Closer Look: School System Indicators

Education and learning possess powerful potential to affect the future health and sustainability of communities. The students of the Northwest Arctic and North Slope boroughs (NAB, NSB) are at the center of the educational systems of Northern Alaska. Students are often navigating two cultures, home and school, which are engaged in a dialogue to more meaningfully coexist, marked by movement toward more community input and control of local education. Ideally, ESSA will continue to shift this balance towards more local control; however levels of cooperation and collaboration unfortunately tend to wax and wane based on leadership at the district and school levels. These leadership positions are potentially important pressure points from which to improve multi-cultural integration.

Students' output, successes, failures, future pathways are what should ultimately be used to assess how successful the education system is in what it purports to do. The measures of student outcome that are most consistently monitored and assessed are graduation rates and standardized assessment results. Schools are evaluated based upon these two measures and they

are the basis of school improvement plans. They are unfortunately a very limited method for measuring success or achievement; additionally, there is a gender gap in student achievement as females regularly outperform males in all subjects.

Table 4 Student Enrollments by School District

	2012-2013	2015-2016
NSBSD student enrollment	1,941 in 11 schools	2050 in 11 schools
NWABSD student enrollment	2,005 in 13 schools	2174 in 13 schools
% of NSBSD student population that is Iñupiat	80%	
% of NWABSD student population that is Iñupiat	95%	

Table 5 Student Attendance Rates by District and Selected Schools

	2012-2013	2015-2016
NSBSD	87%	86%
Barrow High School	90%	88%
Tikigaq School	86%	85%
Kali School	90%	94%
NWABSD	87%	88%
Kotzebue HS/MS	88%	88%
Aqqaluk HS/Noorvik Elem	84%	87%
Kiana School	89%	85%

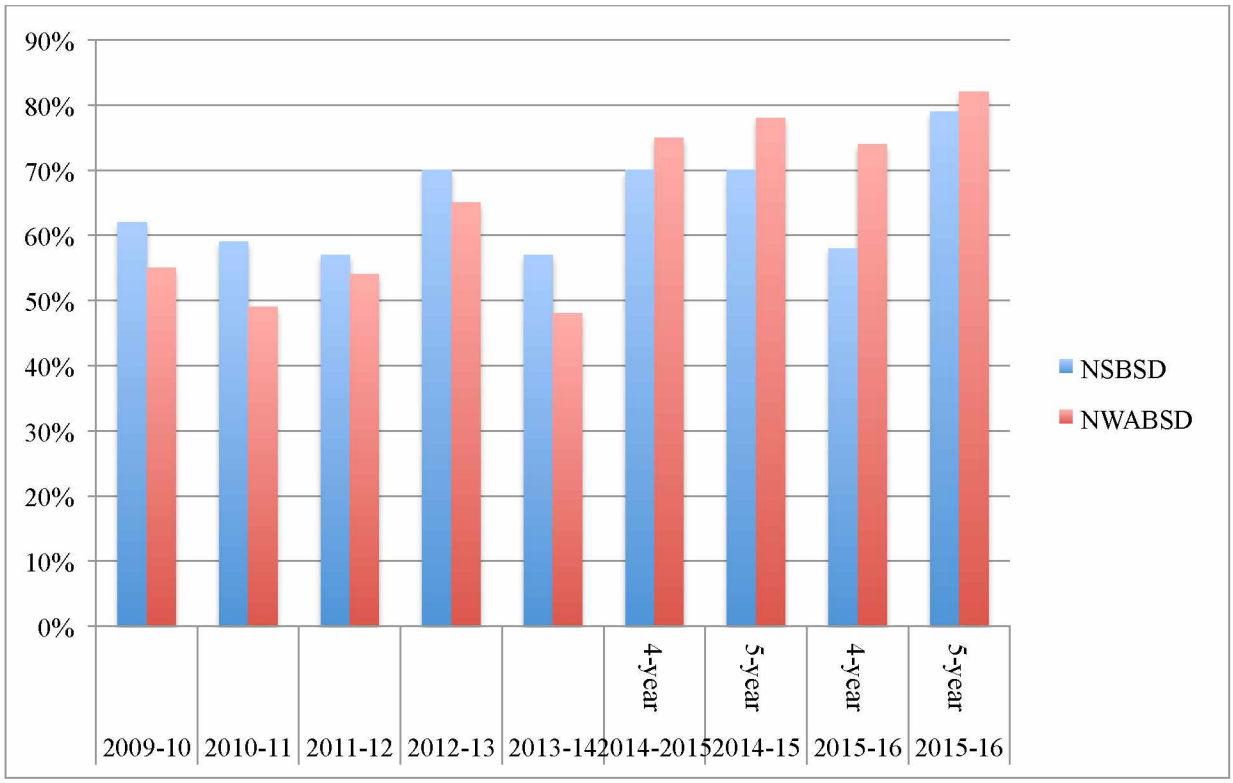

Figure 5 School District Graduation Rates

Figure 6 School District Dropout Rates

The following tables and figures are the 2013-14 Standards Based Assessment (SBA) Results for NSBSD, NWABSD and a selected sample of comparably sized school in each district.

Table 6 SBA Reading Results (grade levels tested)

2013-2014 school year	# Students assessed	% Tested	Proficient Count	Proficient Percent	Below Proficient Count	Below Proficient Percent
NSBSD (grades 3-10)	985	98%	561	57%	424	43%
Utqiaġvik (Barrow) HS (9-10)	106	95%	68	64%	38	36%
Tikigaq (3-10)	111	97%	45	41%	66	59%
Kali (3-10)	43	100%	17	40%	26	60%
NWABSD grades (3-10)	1126	99%	526	47%	600	53%
Kotzebue MS/HS (6-10)	213	99%	139	65%	74	35%
Aqqaluk HS/Noorvik Elem (3-10)	116	99%	49	42%	67	58%
Kiana School (3-10)	71	100%	32	45%	39	55%

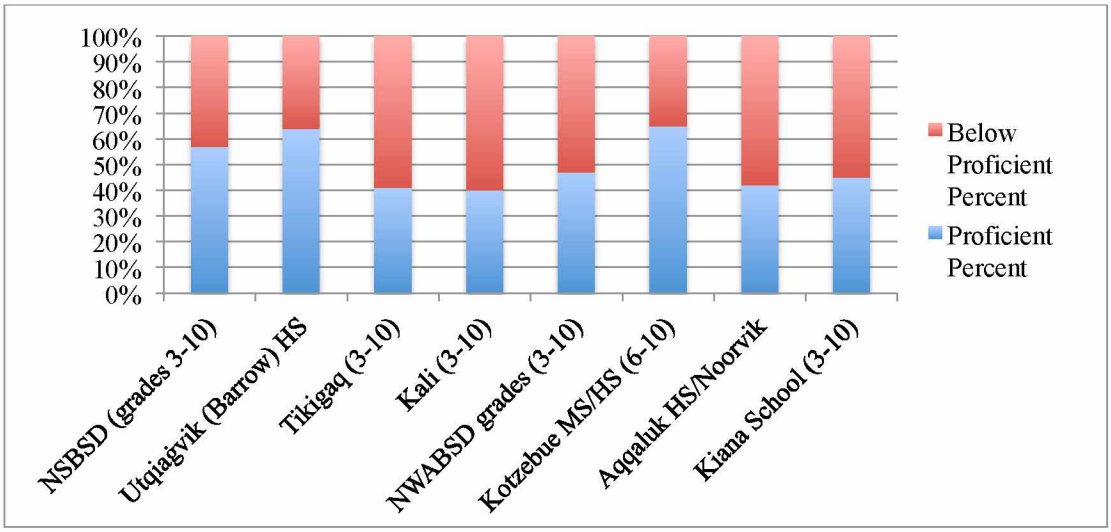

Figure 7 Reading Proficiencies by NAK District and Selected Schools

Table 7 SBA Writing Results (grade levels tested)

2013-2014 school year	# Students assessed	% Tested	Proficient Count	Proficient Percent	Below Proficient Count	Below Proficient Percent
NSBSD (grades 3-10)	988	98%	446	45%	542	55%
Utqiaġvik (Barrow) HS (9-10)	106	95%	69	65%	37	35%
Tikigaq (3-10)	110	96%	30	27%	80	73%
Kali (3-10)	43	100%	11	26%	32	74%
NWABSD grades (3-10)	1119	99%	456	41%	663	59%
Kotzebue MS/HS (6-10)	211	98%	112	53%	99	47%
Aqqaluk HS/Noorvik Elem (3-10)	116	99%	37	32%	79	68%
Kiana School (3-10)	71	100%	25	35%	46	65%

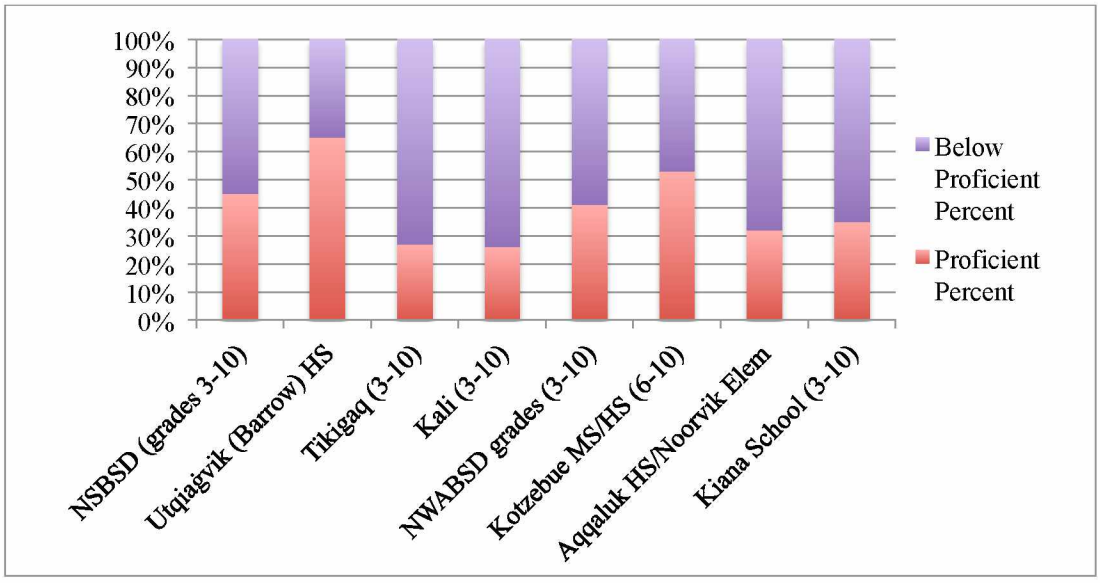

Figure 8 Writing Proficiencies by NAK District and Selected Schools

Table 8 SBA Mathematics Results (grade levels tested)

2013-2014 school year	# Students assessed	% Tested	Proficient Count	Proficient Percent	Below Proficient Count	Below Proficient Percent
NSBSD (grades 3-10)	995	99%	425	43%	570	57%
Utqiaġvik (Barrow) HS (9-10)	107	96%	52	49%	55	51%
Tikigaq (3-10)	111	97%	29	26%	82	74%
Kali (3-10)	43	100%	6	14%	37	86%
NWABSD grades (3-10)	1123	99%	481	43%	642	57%
Kotzebue MS/HS (6-10)	213	99%	128	60%	85	40%
Aqqaluk HS/Noorvik Elem (3-10)	116	99%	39	34%	77	66%
Kiana School (3-10)	71	100%	20	28%	51	72%

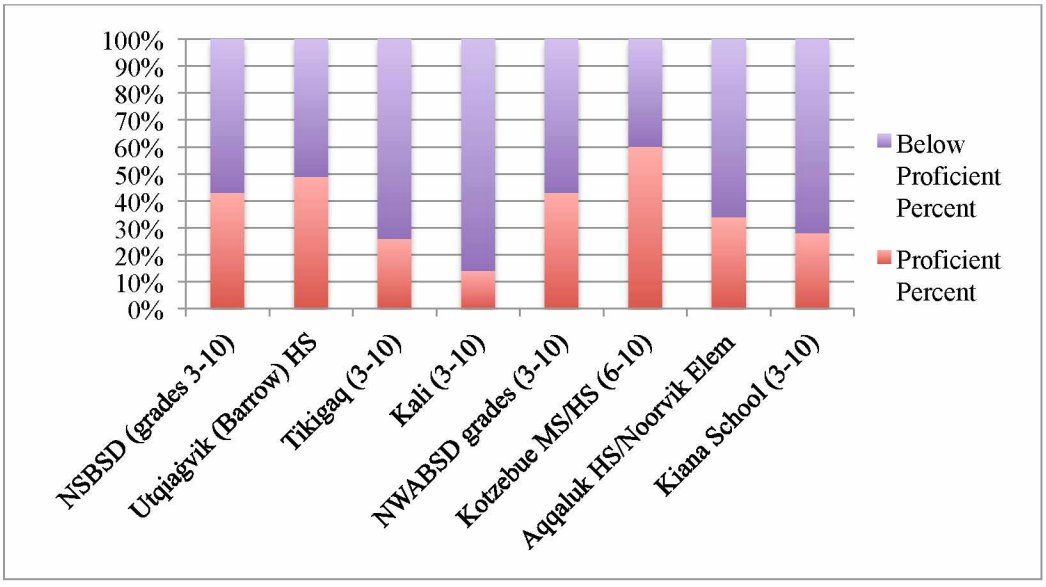

Figure 9 Mathematics Proficiencies by NAK District and Selected Schools

Table 9 SBA Science Results (grade 4, 8, 10 tested)

2013-2014 school year	# Students assessed	% Tested	Proficient Count	Proficient Percent	Below Proficient Count	Below Proficient Percent
NSBSD (grades 3-10)	353	92%	79	22%	274	78%
Utqiaġvik (Barrow) HS (9-10)	43	90%	14	33%	29	67%
Tikigaq (3-10)	29	76%	0	0%	29	100%
Kali (3-10)	19	95%	1	5%	18	95%
NWABSD grades (3-10)	382	96%	84	22%	298	78%
Kotzebue MS/HS (6-10)	75	97%	35	47%	40	53%
Aqqaluk HS/Noorvik Elem (3-10)	38	95%	8	21%	30	79%
Kiana School (3-10)	22	96%	5	23%	17	77%

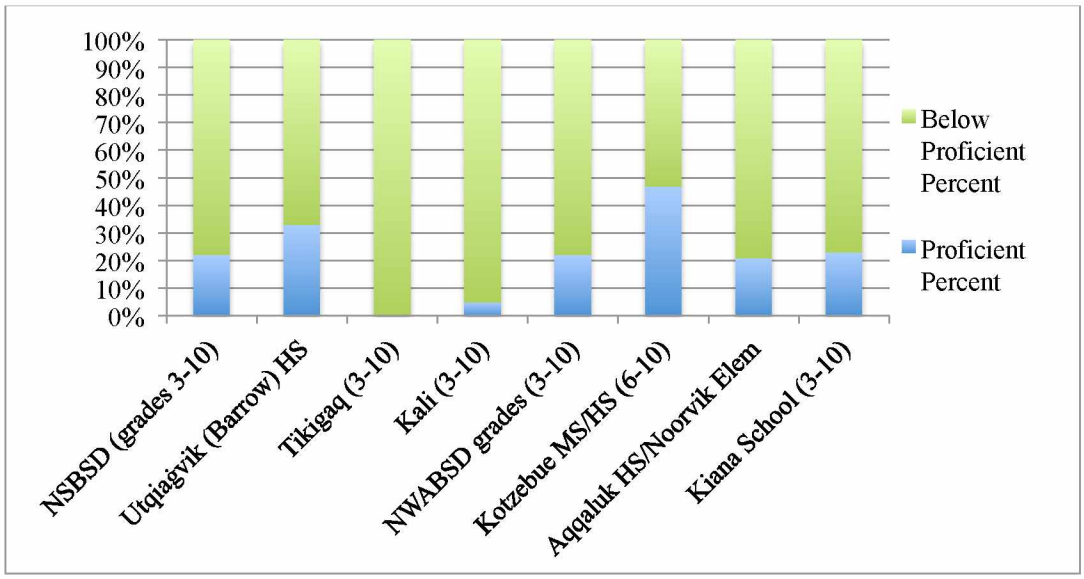

Figure 10 Science Proficiencies by NAK District and Selected Schools

These standardized testing data illuminate the fact that Arctic Alaskan students do not have an equitable chance to achieve grade-level proficiency. The hub schools buoy each district's data. Students attending a village schools are more likely to not be proficient according to grade-level standards in reading, writing, math and science. The scores are highest in reading but trend downward through (in order) writing, math, and science. Reading comprehension is a good base from which to start but the question becomes how to fill the gaps, especially in science, technology, engineering and math (STEM) fields. These results are generally representative of the achievement levels across the assessment from year to year, as annual variance in scores is typically plus or minus 5%. If proficiency in grade-level skills as measured by these assessments is the benchmark, then one must conclude that rural Alaska's Arctic schools are failing to educate students. A sentient being would wonder, how might we approach schooling differently? What other models are out there? Are students succeeding in learning and applying Indigenous Knowledge and how are we measuring that? What other measures could we include in the portfolio of indicators to give a better idea of what students are learning? Is there indeed a "better idea" of what students are learning? Are rural community schools in Alaska an abject failure? What could we do better?

High-stakes standardized tests offer a very narrow view of the scope of what education is and could be in rural Alaska and for Alaska Natives. It is understandable that the government does not wish to fund programs that do not demonstrate educational benefits, yet universalized testing that is meant to be fair is actually far from it. This is because of underlying sociological factors such as power dynamics, economic inequality, historical trauma, and cultural blindness. (Watanabe, 2008; McCarty, 2008) These standardized tests have also provoked unintended, negative incentives. For example, studies have been conducted that show that school districts

with a high population of Native American children saw surges in the percentages of students held back from graduating or placed into special education after the implementation of NCLB (Beaulieu et al., 2005). For Alaska, the No Child Left Behind legislation has negatively impacted schooling in the state's rural communities and its Alaska Native students. The legislation accomplished little in improving equity or school programs but did much to disenfranchise and divide students and communities. The law furthered the enforcement of the 1994 Elementary and Secondary Education Act mandates for student testing and school accountability. The law subdivided its mandates and outcomes into four main areas:

- Accountability and Assessment
- Teacher Preparation
- Choice
- Scientifically-Based Research

Out of these four, the assessment and accountability portion of the law has easily been the law's most contentious and most expensive facet. A 2008 National Research Council report found that "to minimally comply with standards, assessments and accountability the real resource costs are in the range of $125-174 per pupil, or $6.1-8.5 billion total per year throughout the nation" (Harris, Taylor, Levine, Ingle, & McDonald, 2008, p. 2). Given the substantial funding being appropriated for accountability and assessment reforms, it is incumbent on state leaders to analyze how the policy worked for their constituents across a wide range of contexts. In Alaska, there are a variety of constituents as well as two different school systems (urban and rural) existing under the control of a single Department of Education and administrative body.

The quest to standardize the assessments and accountability fails to take into account the historical and cultural context in which schooling is taking place. These assessments also fail to

address Alaska Natives' full complement of skills, knowledge, and ways of knowing and their communities' desire to have these as outcomes for their students. There are many possible alternatives and additional measures to develop a more complete picture of how schools serving Alaska Native students are performing and what Alaska Native students are learning. Assessment methods and school improvement efforts need to take into consideration the historical context and the cultural context of rural and/or Native Alaskan schooling experiences.

One context-specific method to consider is through local on-site strategic language planning, inclusive of all stakeholders and community members. For example, Alaska's Yup'ik language program in is one of the more successful programs in the state. The Yup'ik schools included in the Wyman et al. (2010) study have many years of history of teaching the Yup'ik language in the school system, especially in elementary schools. Early and ongoing language learning can help to dispel some of the fears parents have about the seeming compromises of spending time learning a second language in the face of English only high-stakes testing. Intentionality in the planning and response process of developing language programs can facilitate Yup'ik language revitalization as well as produce proficient results on standardized tests (Wyman et al., 2010, 714). Although much of the learning and lessons of this study may be useful and applied to other regions in Alaska, Native Alaskan language geographies are in a state of flux in the balancing act between the pressures of teaching heritage languages and English. It is a state of survival rather than a state of sharing successes and best practices.

Opening dialogue amongst community members is the key to true accountability and long-term school improvement. Valuing the input of Alaska Native language speakers, elders, and community members in the strategic planning of language programs as well as valuing their contributions to this type of research engages many of the resources necessary to revitalize

language in the face of monolithic school systems and their accountability mandates. There are other measures available to assess student learning besides mainstream, white, culturally-biased federal and state assessments. The quantitative methods of NCLB are statistically rigorous as far as assessing NCLB policies and outcomes but only take into account a slice of student data on learning. Often, teachers' assessments of their students are even better measures of authentic student learning and progress (Black, 1998a). Through a review of the literature on formative classroom assessments, Black and Wiliam found that "improved formative assessment helps low achievers more than other students and so reduces the range of achievement while raising achievement overall" (Black, 1998b, 141). In the regime of high-stakes assessment, the teacher's unique ability to assess student learning is not valued as an indicator and additionally is not considered in school-wide reports or improvement plans. This is yet another example of the deprofessionalization of teachers by the high-stakes assessment and accountability mandates of NCLB.

In addition to the external pressures of NCLB, rigorous and intentional Native language development programs are also faced with the dominant language exerting pressure on the intra-village language paradigm. Research demonstrates that students can be as successful, if not more so, in learning when educated in their first language, and then are subsequently better supported in English acquisition through their first language (Cook, 2001). A school system that values and encourages the language and cultural inputs of the community inculcates an inclusiveness that draws parents and the community into the work of the schools. Educating the parents and involving the community in the educational program also prove to be valuable additions to the full complement of educational inputs to the students' lives. Solely focusing on high-stakes accountability and universally comparable data cuts out of the process those who will actually

improve the school and benefit from its improvement. It is important to note that during the NCLB period, the Alaska Board of Education made no provision for testing in languages other than English. Decisions such as this can leave parents and family members without recourse, access, and/or contributions to the educations of their students. Under Alaska's new Commissioner of Education, Michael Johnson, there is hope that the dialogue is shifting towards an emphasis on greater local control and input for Alaska Natives in the determination of educational programming. With the implementation of ESSA, some Alaska Native educational funding has been reallocated toward tribal control. When the school system facilitates local participation in the conversation, whether it concerns language planning or the objectives or interpretations of standardized tests (and hopefully some day curricula), it stands to improve the educational program's relevancy, impact, and results.

Complicating the issue is the fact that, except for slight increases in hub communities (Hamilton & Seyfrit, 1993; Hamilton, Saito, Loring, Lammers, & Huntington, 2016), Northern Alaska village student enrollments are dwindling. This outmigration is having a negative impact on operations for many of the smaller Arctic schools in Alaska. Village students consistently demonstrate insufficient proficiency based on standardized assessments, as well as higher dropout rates; this is a problem not only in Alaska but across the Arctic. With Northern Alaska's greater percentages of Indigenous students, the education systems in the boroughs have spent decades since Statehood making glacial movements and concessions towards more locally based, Indigenous-driven curricula. There is great potential for increased local input and control of public schooling if local and tribal organizations could better advocate for greater local and/or tribal control of schools, the passage of ESSA, and its efforts to transfer some decision-making to communities.

> The beauty of the new legislation is that your state will work with locals to develop how ESSA actually plays out in your state. Collectively, local leaders can make a huge difference if we get our local acts together with parents, staff, and community leaders. There is time and that time is now. (Bagin, 2016)

The federal government is once again realizing that its one-size-fits-all efforts miss the mark for students who do not exist in the Lower 49 mainstream. Outlier cases like Alaska need alternative efforts to support public school students in its rural communities. Why not find ways to turn over more control to local communities? This seems to be what ESSA is attempting to do, but will this mean sacrifices in quality, content, or college preparation? There are always trade-offs. While tacit efforts are finally being made in this arena reform efforts are gradual and often hindered by bureaucratic and budgetary constraints. Both school districts are making efforts to incorporate more Indigenous pathways and knowledge in teaching and learning, although little of this is reflected in the state of Alaska's standards-based, mandated assessments (Alaska Department of Education & Early Development, 2015). As noted above, there is a gender achievement gap with males' assessment performance and graduation rates well below their female counterparts. In addition, female Northern Alaska students also pursue post-secondary education more frequently than their male counterparts (Hamilton, 2010; Hirshberg et al., 2014).

> What are the consequences, if more women than men leave? One obvious result for source communities is that men have reduced prospects to find long-term partners and form families—the key transition to adulthood for many. Some Alaska informants described increased pressures on teenage girls, creating problems for them and further incentives to leave. (Hamilton, 2010, p. 7).

Communities, in order to survive, need to secure ways to support the pursuit of livelihoods by both female and male community members. This is especially important in the smaller villages as these are proving to be the communities most affected by female out-migration.

3.5 Public School Personnel

Public schools are one of a multitude of places that students learn behaviors and practices towards the environment. Schools can educate students with the knowledge required for practical decision-making in the natural world. Local school personnel can contribute immeasurably to these aspects of education outside the home, even if it is not very often they join students on the land. Education systems can inform how adults conceptualize a healthy and sustainable community, both individually and collectively. Schools in Northern Alaska are remote and off the road systems, and many of them serve a large percentage of Indigenous students. This isolation and service to diverse cultures makes Arctic schools of particular importance when considering their multifaceted impacts upon healthy and sustainable Arctic communities.

3.5.1 Main Indicators

This overview is a summary of educational indicators driven by the influence of school staff in Northern Alaska communities, as reported to Alaska's Department of Education.

- 3-year average teacher turnover in NSBSD over the years 2011-2014: 27.9%
- 3-year average teacher turnover in NWABSD over the years 2011-2014: 24.6%

(Hill & Hirshberg, 2013)

While some teacher turnover is healthy for an educational system, having regular turnover of one out of every three or four staff members does little to ensure program development, consistency,

or success. Additionally it has negative impacts on students academically and emotionally as they must repeatedly rebuild rapport, connectivity, and communication with their educators. These statistics come despite years of efforts by Alaska's state government, universities, and school districts to reduce teacher turnover, especially in rural areas (Hill & Hirshberg, 2013). Turnover in administrators of rural schools in Northern Alaska is also problematic in compounding the problem of the high turnover of teachers. Leaders in a school carry out many of the duties that bind together a staff and a student body, and each leader often brings in his or her own priorities and areas of expertise. Frequently staff and student body are headed down a path towards some kind of improvement when a new leader may come in and change directions; this sort of constant change and haphazard reforms are unlikely to produce much data that would be useful to inform curriculum, pedagogy, or practice. These kinds of changes, placed alongside state and federal curricula demands create great uncertainties for school systems. Teacher Turnover Rates for NSBSD, NWABSD, and Rural Average (Hill and Hirshberg, 2013)

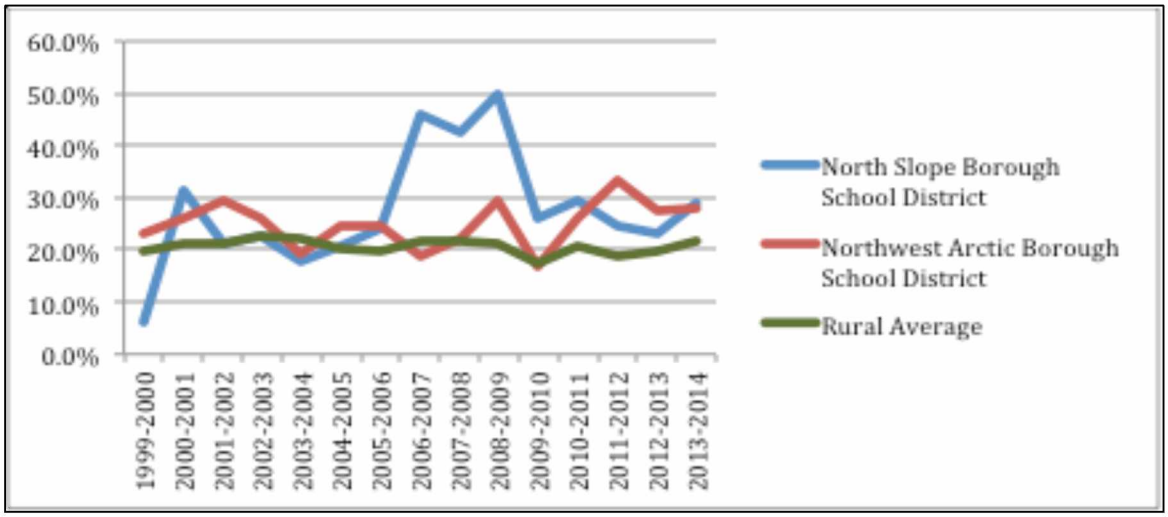

Figure 11 Teacher Turnover Rates for NSBSD, NWABSD, and Rural Average, 1999-2014

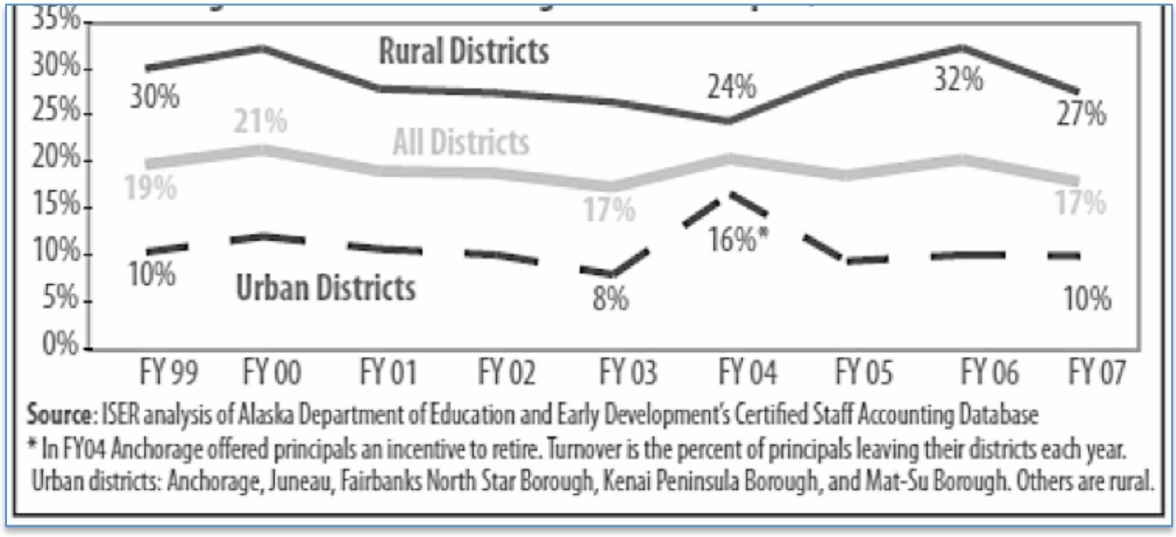

Figure 12 Alaska Principal Turnover Rates, All, Rural, and Urban, 1999-2007

Rural principals are even more likely than teachers to leave their jobs. Turnover among rural principals was 27% in 2007, compared with less than 22% among rural teachers (Hill & Hirshberg, 2008). In 2012-2013 there was still a 23% turnover rate of administrators leaving districts, which reaches 36% including administrators who changed schools within the district (Hishon, 2013). High turnover rates among teachers and administrators continue to cost large sums of money and negatively impact school programming and student success to this day.

3.5.2 Cultural Preparation of Incoming Teachers

There is no universal and mandatory program for the cultural preparation of outside teachers who come to teach in rural, mostly Indigenous schools. Many of the programs that do exist are tied to inconsistent funding from federal grants or state budgets. Not all teachers attend culture camps, and those teachers that do absorb the information at different rates. This knowledge is context-specific and often takes much time to reveal its relevance to teachers and their pedagogy. Efforts at cultural preparation are in their infancy and have many wrinkles to be

ironed out before they effectively prepare teachers to impact the school climate and teaching in rural classrooms.

The efforts that do exist vary immensely. Some school districts, including NWABSD, offer new educators one-week culture camps in a hub community supplemented with a brief period out in the Bush. In Northern Alaska these culture camps typically take place near Utqiaġvik (Barrow) or Kotzebue. Elders and Indigenous knowledge holders share stories, skills, and knowledge to best prepare the new round of incoming school personnel for some of the cultural norms of the community. School personnel who do not attend may occasionally participate in one or two trainings based around cultural values/norms during a 1 to 1.5 hour professional development activity at the school site. Culturally prepared school personnel should be regularly involved throughout the school year in community activities and social events, with a shadow or mentor engaged to facilitate early linkages between new school personnel and the culture of the community.

The NSBSD has also initiated cultural camps to train and prepare new school personnel to engage and incorporate Iñupiaq culture. The goal is to increase teacher retention in the NSBSD by better preparing teachers through cultural camp experiences. This type of training continues throughout the school year utilizing the Iñupiaq Learning Framework (ILF) as a basis for developing lessons. In Northwest Arctic Borough School District (NWABSD), the cultural preparation process is somewhat similar to the NSBSD, but the NWABSD is not doing a pedagogy treatment like the NSBSD's ILF curriculum framework.

These cultural experiences will better prepare teachers to work with North Slope students and incorporate the Iñupiaq Learning Framework into their instructional units as per the NSBSD's Curriculum Alignment, Integration and Mapping initiative; they also increase teacher

exposure to Understanding by Design, a learning-design framework used by the district. In 2015, Cope and Hirshberg conducted an external evaluation of the Curriculum Alignment, Integration and Mapping effort including the integration of the Iñupiaq Learning Framework and Understanding by Design, and identified these strategies for increasing cultural competency:

- Create companion digital resources for teachers to use the Inupiaq language stories during instruction, similar to the other digital resources provided for the English language curriculum.
- Have four (4) two (2) credit courses, 1 per ILF Realm – optional
- Expand Culture Camp - Keep culture camps going and expand for each site
- Support meetings with new teachers, Iñupiaq Language Teachers (ILT) and School Advisory Committee (SAC), Whaling Captains and others in the community
- Have a cultural piece every day of New Hire In-service training, including an ILF element, Curriculum Alignment, Integration and Mapping Project (CAIM)
- Have a cultural focus as a part of every in-service, hands on, e.g. Return of the Sun Dance, ILTs storytelling
- Use a Cultural Competency survey tool with new hires (pre/post); have new hires complete a sequence of Visual Iñupiaq Language Assessment (VIVA) activities? (Cope & Hirshberg, 2015, p 29)

These suggested strategies for improving Iñupiaq cultural competency were written specifically for the NSBSD context but could easily be applied to the development of a similar program for cultural training in the NWABSD. The keys are consistent leadership, useful and timely

professional development, and building partnerships among the school and community members, new and experienced teachers, and new teachers and local Iñupiaq experts.

3.5.3 Advancement of Local, Indigenous, and Iñupiaq Teachers within Existing System

Few local teachers are given opportunities to move into leadership roles in the school system. In 2012, 6% or 12 of 201 rural school administrators were Alaska Native and 5% or 15 of 289 urban school administrators were Alaska Native (Hishon, 2013). Local employees and prospective employees of Northern Alaska school districts are seeking advancement of local candidates, from the ranks of paraprofessionals to teachers and teachers to administrators. However, local candidates, from educational support roles to Alaska Native language teachers, currently struggle to be integrated, tenured and/or promoted up the district workforce ladder. One obstacle for movement up the public school employment hierarchy is passing PRAXIS, a national exam used in Alaska. PRAXIS is cited by rural educators as being culturally inappropriate and limited in applicability to assess what teachers in rural Alaska need to know. In rural K-12 schools, teaching and school leadership are not promoted as potential career paths, in comparison to the support shown for STEM. Another obstacle is the lack of supportive infrastructure for facilitating prospective Alaska Native educators in their pursuit of an education degree and career.

There are numerous benefits to community members serving as pillars of the school. Local community members involved in the education of the youth provide mentorship, school-to-community-to-business partnerships, additional livelihood skills, knowledge, and Iñupiaq language support. In turn, students can more readily see the connection between school and community life when the two are interwoven. Often-cited barriers to community involvement in

schools are: 1) the need to devote all instructional time to "teaching the standards;" 2) a lack of relationships between school personnel and community; and 3) the understanding, knowledge and history of relationship-building needed to identify productive and powerful methods to integrate Indigenous and Western education. Some schools in Alaska find ways to pay Elders and others with Indigenous Knowledge to be teacher substitutes/alternatives or to co-teach curricula. This might be an alternative method to finding avenues to get local people on the payrolls of their local schools. The Inuit Circumpolar Council- Alaska (et al.) are beginning the process of reimagining teacher certification in Indigenous communities. Efforts are currently underway rethinking how that teacher preparation should arranged.

3.6 School Performance

While the Alaska School Performance Index (ASPI) composite scores are a somewhat useful tool in evaluating schools and their effectiveness, they incompletely capture all that schools do to impact student outcomes. ASPI scores were discontinued in 2014-2015. I include them in the chapter (next page) as an example of how standardized evaluations may not make much sense for Alaska's rural schools, or even for urban schools with significant populations of Indigenous students. In these cases, home language, culture, and livelihood practices may be an important part of learning but take place outside of compulsory education, and are not reflected in the composition of ASPI scores.

School accountability, based in the constraints of NCLB, detrimental when it is solely based on a single high-stakes, culturally-biased, historically insensitive assessment to evaluate school programs. Each school is in itself a complex system deserving of a multi-faceted and efficiently comprehensive assessment of the many methods by which the school inculcates a varied suite of knowledges and wisdom to students. A policy that implements a wider array of

school conditions and environment would invigorate school improvement efforts by delivering more robust data to back efforts to improve schools for students through increased self-determination. Hopefully ESSA pushes compulsory schooling further towards an accountability system that more accurately reflects the needs and people of the communities the public schools serve. The following table of school indicator data is from the Alaska Department of Education & Early Development's Alaska School Performance Index (ASPI) Two-Year Comparison: 2012-2013 and 2013-2014.

Table 10 Summary of ASPI Ratings Sorted by Schools within Northern Alaska School Districts

District Name	School Name	City	Grade Levels	2012-13 ASPI Score/Stars	2013-14 ASPI Score/Stars
NSBSD	Alak School	Wainwright	PK-12	63.70**	56.63**
NSBSD	Barrow High School	Utqiaġvik	9-12	82.75***	80.51***
NSBSD	Eben Hopson Middle School	Utqiaġvik	6-8	69.64***	66.59***
NSBSD	Fred Ipalook Elem	Utqiaġvik	PK-5	70.47***	67.58***
NSBSD	Harold Kaveolook School	Kaktovik	PK-12	76.77***	76.68***
NSBSD	Kali School	Point Lay	PK-12	61.93**	58.87**
NSBSD	Kiita Learning Community	Utqiaġvik	9-12	18.98*	56.29**
NSBSD	Meade River School	Atqasuk	PK-12	50.35*	51.88*
NSBSD	Nuiqsut Trapper School	Nuiqsut	PK-12	48.60*	48.32*
NSBSD	Nunamiut School	Anaktuvuk Pass	PK-12	52.03*	57.07**
NSBSD	Tikigaq School	Point Hope	PK-12	55.40**	56.00**
NWABSD	Ambler School	Ambler	PK- 12	61.58 **	69.54***
NWABSD	Aqqaluk High/Noorvik Elem	Noorvik	PK-12	59.82 **	57.38 **
NWABSD	Buckland School	Buckland	PK- 12	72.27 ***	76.18***
NWABSD	Davis-Ramoth School	Selawik	PK- 12	43.35 *	41.75 *
NWABSD	Deering School	Deering	PK- 12	84.50 ***	82.75***
NWABSD	June Nelson Elementary	Kotzebue	PK- 5	80.77 ***	81.03 ***
NWABSD	Kiana School	Kiana	PK- 12	53.45*	64.41**
NWABSD	Kobuk School	Kobuk	PK- 12	61.21**	72.66***
NWABSD	Kotzebue Mid&HS	Kotzebue	6- 12	65.04 ***	74.44***
NWABSD	McQueen School	Kivalina	PK- 12	46.71 *	58.21**
NWABSD	Napaaqtugmiut School	Noatak	PK- 12	64.89 **	67.11 ***
NWABSD	Home School	Kotzebue	KG- 12	No score	50.04*
NWABSD	Shungnak School	Shungnak	PK- 12	47.00*	47.16 *

ASPI Indicators

Academic Achievement

- Percent of students proficient or above for all students tested on state reading, writing, and mathematics assessments.
- For schools not meeting 95% participation rate, all non-tested students are considered not proficient.

School Progress

- Progress from previous year's SBAs measured by Growth & Proficiency Index.
- Includes all students and four primary subgroups (at least five students): Alaska Native, Economically Disadvantaged, Limited English Proficiency, and Disabilities).
- Each subgroup included represents 10% of overall progress points; all-students group represents the remaining percentage to total 100%.

Attendance Rate

- Based on attendance rate for a school.

Graduation Rate

- Based on the greater of the school's 4-year or 5-year adjusted cohort for all-students group.

College & Career Ready

- Points for test scores on ACT, SAT and WorkKeys certificates by seniors; average scores of all 12th-graders participating (weighted at 8%).
- Participation rate for WorkKeys assessment for 11th-graders enrolled on October 1, (weighted at 2%).

3.7 Key Trends in both Boroughs

Both boroughs, for reasons explained above, face similar challenges as a result of several trends. (1) There has been a growing acceptance of educating in and revitalizing the Iñupiaq language, but it is unclear if this has happened in time to reverse the language decline or if the amount of time being allocated is enough to meet this goal. (2) Similarly, there is increased use of Iñupiaq knowledge, language and ways of teaching and learning in some formal school systems, though it is still minimal and underdeveloped. Like the first trend, this is not a uniform process and is vulnerable to budget limitations and state and federal policy changes. (3) Similarly, new hires, teachers and administrators are subject to inconsistent orientation, training, and professional development contingent on ever-changing policies and budgets. (4) There are

multiple challenges inherent in delivering education in rural and remote locations, including school consolidations and closures; providing access specifically for secondary and tertiary education options; and difficulties in recruiting and retaining teachers and administrative staff consistently. (5) Due to the shifting foundations of public education budgets and policies at the state and federal levels, future support for schools, especially those in the smaller villages, is uncertain. (6) Climate change pressures will likely mean new and different sorts of school buildings; energy systems will need to be re-developed and or constructed. (7) The population demographics of Arctic Alaska will affect the number of children in schools and the kinds of programs needed. Fluidity in population and migration patterns affect social services and school populations, which in turn impact school personnel, services, and viability. (8) Low rates of proficiency on assessments, low to middling rates of graduation, and high dropout rates continue to negatively impact rural and Indigenous students across the region to an uncertain extent. (9) The gender gap continues, with females generally performing at a higher level than males and also going on to attain additional schooling or training. (10) Limits to rural Alaska Internet bandwidth preclude the use of some technologies and alternative education opportunities, though this may soon change with the Quintillion project's promise of high speed Internet for Arctic Alaska via a subsea cable system.

These societal and local trends continue to have major impacts on school system indicators. But beyond specific components - how well does this system, as a technique of governance, work in practice? The lack of applicability and flexibility in the system keeps students away from key components of social-ecological resilience (language, time on land, time at sea, time with Elders, physical work related to thriving in the Arctic like snowmachine repair, stitching garments, tending sled dogs, whaling, hunting, gathering food. The next chapter

presents a small-scale study of three schools in the North Slope Borough. It focuses on the challenges of these schools and reveals a need for flexibility in order to bolster the individual resilience of students, which in turn can contribute to community resilience as these learners become leaders.

Chapter 4 Alternative School Practices for Indigenous Students: Theory and Praxis in the North Slope Borough

4.1 Introduction and Method

In chapter 3, I reviewed the context and connections between compulsory education and Indigenous learning. In this problem area, my focus is on how these connections are both frayed by and present an opportunity for transformation in Alaska as the NCLB era passes by and - in part due to a scholarly focus on the Arctic's rapid social-ecological changes - we gain a new understanding of the importance of culture to learning. This chapter approaches a thread of resilience studies not often broached by natural or hard scientists: individual resilience. In this vein, I use resilience terminology but do not adopt the entire suite of resilience concepts (e.g., vulnerability, perturbation, panarchy). I try to bring together the two disparate threads of thinking about resilience by focusing on school programming and the possibility for alternative educational practices that can foster educational resilience literature calls "protective factors" that help young people be resilient. This research links the nature of education for Arctic Alaska, its Indigenous peoples, and their self-determination. I ground my study in research done in Utqiaġvik, Point Hope, and Point Lay during a two-month internship in Utqiaġvik working with an alternative school, the Kiita Learning Community and the North Slope Borough School District (NSBSD). I found compelling linkages between the concepts of alternative education – educational processes designed to help students not achieving in the standardized classrooms to sufficient levels required by governments – and the literature on Indigenous self-determination. The latter addresses, in part, why people who are Indigenous do not "achieve", or, more bluntly, do not fit in as docile subjects (Foucault, 1977) to the governing arrangements that they inherited

from colonialism. I will press more on this in subsequent chapters informed by the Northern Alaska Scenarios Project research, but here I wish to explain the parallels in literature. In sum, the question that this chapter addresses is, How and why are small communities on the North Slope considering alternative schooling? To answer this one must explore the connections between individual resilience, local-scale Arctic Alaska schooling alternatives, and Indigenous self-determination. In particular, how have community members in Utqiaġvik, Point Hope, and Point Lay conceptualized their own connections and discussed their own problems with high school education? My hypotheses were as follows:

- H8: Given the similarity in terms of region and culture, the three communities will have similar understandings of and suggestions for alternative schooling.
- H9: Pt. Hope and Pt. Lay will be more similar in their results than either will be with Utqiaġvik given the latter's role as a hub community with greater material wealth.
- H10: The strong role of Inupiat culture (and the popular Inupiat Values) will mean a mix of formal and informal learning practices will be favored across cases.

I began my internship in September of 2012, under the tutelage of then NSBSD Superintendent Peggy Cowan (who now serves as the NSBSD's Chief Executive Officer). Some of the smaller villages in the borough had expressed a desire to offer an alternative school setting similar to Kiita Learning Community in Utqiaġvik, in order to address the needs of students in their villages who were struggling in their current school setting. I was charged with finding out what these needs were and how this type of alternative schooling might be brought to villages with considerably smaller school-age populations than that of Utqiaġvik. I started the process by visiting and observing the Kiita Learning Community. I interviewed the principal, staff, and students at Kiita to better understand the context, the methods of schooling, and the outcomes.

This process helped me shape the survey questions for the two villages I would visit, Point Lay and Point Hope. I identified three important groups that were necessary to interview in this study: students, parents and school staff. I developed three parallel but population-appropriate interview instruments to be used with each group, grounded in the preliminary interviews conducted at Kiita. Each interview was comprised of open-ended questions. This allowed interviewees to digress as they answered the questions and relayed experiences related to the line of questioning. The interviews ranged in length from ten questions for students to sixteen questions for parents/guardians and school staff. The interviews I conducted in October 2012, early in my research process provided a useful departure point for working to discover the links between education, multi-level social resilience, and thinking about futures.

My research was informed by interviews of students, parents and school staff in the North Slope Borough School District. These interviews were conducted around the idea of providing alternative school options for students in villages outside of Utqiaġvik (Barrow), Alaska, the hub city of the North Slope Borough. These qualitative interviews were key to my gaining a better understanding of the lay of the land; the relationship between community and schooling; and the disconnect between schools, students and community that occurs in some instances in the NSBSD. These one-on-one interviews and conversational mode (Yin, 2011) enabled a personal connection between interviewer and interviewee about a topic of great importance to both of us. Over the course of 60-120 minute interviews, the interviewees became more at ease and the responses generated often were deeper and closer to the real issues impacting resilience and education. Even though I had not met any of the interviewees previously, I did my best to develop each interview as a social relationship and establish a rapport with each individual as the interview progressed (Yin, 2011, 134 & 138). The parallel

question design allowed me to identify recurring themes across Point Hope and Point Lay. In this way I completed two directly comparable case studies, which were also informed by a third study in Utqiaġvik that differed in some respects, but focused on the same issues. This enabled me to gently modify interview questions on the ground while still asking parallel questions so that interviews were comparable across the three distinct groups of school stakeholders in each interview set. While the interview data results are deep, the net cast by the open-ended questions was also broad. These interviews generated many varied outcomes and responses that can be used to address first and second order needs from public schooling.

4.2 The Connection between Resilience and Self-Determination

> Hence, we advocate for the use of participatory scenario planning/building as a methodological tool not only to explore interconnectedness, surprises, and uncertainties but also to offer empowering learning spaces where multiple voices, experiences, and constraints can be heard. Echoing action research/learning (AR/AL), we see it as an 'exercise of agency.' (Ramos 2006b from Tschkaert & Dietrich, 2010, p. 14)

To be honest, had I written this dissertation without in-depth experience in the hub and village communities, I might not have addressed self-determination directly. But, in my path towards discovering what I was passionate about through the Resilience and Adaptation Program, I helped develop the Northern Alaska Scenarios Project (NASP) and then served as a researcher with the project. While the project was not co-designed from the beginning with local participants—Arctic residents affiliated with the concept of community health and sustainability—it did co-produce knowledge with these participants through its workshops (49 total over two years). Additionally, these residents serves as consultants and advisors as the

project proceeded. These workshops helped me to think through the links between fate control, self-determination, and education, which I will discuss at greater length in chapter 5.

For me, the clearest discussion of the importance of understanding self-determination has comes from Brayboy's 2005 article about tribal critical race theory in education. He develops a concept called "TribCrit," a response to the critical race theories that evolved in the 1970s-1990s to fill gaps in how scholars and practitioners addressed the presence of people of color in a variety of social and government institutions. But, Brayboy (2005) found that these theories, while important steps forward, could not fully address the role of Indigenous peoples because they have not only a racialized relationship with United States society but also a *governmental* relationship. He points out that critical race theory (CRT) was designed to address racism stemming from slavery (for African-Americans in the U.S.) and issues of language and immigration status for Latinos, but it had not yet covered the concept of colonialism that defines the relationships among Indigenous peoples, governments, and educational practices. Brayboy's theory has nine tenets; I list them here because they build upon one another but my work focuses primarily on his points 4-7.

1. Colonization is endemic to society.
2. U.S. policies toward Indigenous peoples are rooted in imperialism, White supremacy, and a desire for material gain.
3. Indigenous peoples occupy a liminal space that accounts for both the political and racialized natures of our identities.
4. Indigenous peoples have a desire to obtain and forge tribal sovereignty, tribal autonomy, self-determination, and self-identification.
5. The concepts of culture, knowledge, and power take on new meaning when

examined through an Indigenous lens.

6. Governmental policies and educational policies toward Indigenous peoples are intimately linked around the problematic goal of assimilation.
7. Tribal philosophies, beliefs, customs, traditions, and visions for the future are central to understanding the lived realities of Indigenous peoples, but they also illustrate the differences and adaptability among individuals and groups.
8. Stories are not separate from theory; they make up theory and are, therefore, real and legitimate sources of data and ways of being.
9. Theory and practice are connected in deep and explicit ways such that scholars must work towards social change. (2005, pp. 429-430)

Working backwards, notice that no. 7 directly addresses adaptability – a quality cited in resilience theory notes as vital for a system and its components to persist over time. Humans, ecosystems, land- and seascapes respond, for good or for ill, as conditions change. The key to such responses when we consider them from a normative perspective is that this adaptation be positive, not maladaptive. This drives home the point that education must contain Indigenous knowledge if it is to foster genuine adaptive capacity across the state of Alaska. Note that this is generally well-accepted in Alaska given the revitalization programs both in place and under development for Indigenous languages, which incorporate the knowledge of Elders, the need to address trauma, and the importance of including youth. Please note, I do not suggest these programs are all successful, or even well designed, just that the state government and departments have formally recognized that Alaska Native peoples' cultures matter. But, if one accepts point no. 7, it becomes a logical progression to move to points 6, 5, and 4. Educational legacies of colonialism have forced assimilation that has marginalized Indigenous Knowledge

and largely destroyed efforts at self-determination. Consequently, the modern movements for self-determination are intimately tied to education. This filters down to the level of students (of any race and identity) who are in clear need of some self-determination in their educational processes.

Brayboy defines self-determination as "the ability to define what happens with autonomy, how, why, and to what ends, rather than being forced to ask permission from the United States. Self-determination rejects the guardian/ward relationship currently in place between the U.S. government and tribal nations" (p. 434). Furthermore, knowledge "of these current relationships allows researchers ways to better analyze interactions between Indigenous students and the institutional structures. Ultimately, these analyses may lead to a reconceptualization of the parameters for engaging Indigenous students within institutions" (p. 434). It is this understanding of current relationships that the project I explain below tried to address. Knowledge that lets participants in a system reconceptualize their roles creates a diversity of perspectives and reference points and diversity is a key to system resilience (Ricklefs, 1997).

4.3 Alternative School Case Study

In Autumn 2012, North Slope Borough School District Superintendent Peggy Cowan asked me to explore the feasibility of alternative school programs noted in the Strategic Plan of the NSB villages of Point Hope and Point Lay. The complete goals and sub-goals for alternative school programming as stated in the NSBSD Strategic Plan 2010- 2015 are detailed below in italics. I list them, then take them apart to consider carefully what the words mean for the study of individual and community resilience. I discuss the role of interviews as a method in chapter 1.

The North Slope Borough School District's goal concerning Alternative School Programming in

the 2010-2015 Strategic Plan:

1 All students will reach their intellectual potential and achieve academic success through integrating Inupiaq knowledge systems into the core content areas.

1.2 Academic Success: Students will be proficient or excel in academic areas at a rate equal to or higher than National Standards. (06/30/13)

1.2.1 Develop Alternative School Model (e.g., distance delivery, alternate structure, credit recovery, pull out classes): Selected sites will develop an alternate school model to meet the needs of our students with the intent of improving academic achievement and graduation rates. Sites will research models, pilot program(s) and report progress at the end of each semester of implementation. (Responsibility: Principals)

4.3.1 Scope and Purpose of the Study

The scope of this study was to explore how some of these alternatives might be applied in a village school setting. Specifically, I conducted field-study research at Kali School in Point Lay and Tikigaq School in Point Hope. I will refer to this as my pilot study because I did not publish the results and plan to return to both locations for a follow-up study to gauge changes over time. The purpose of the research was to evaluate the feasibility of implementing an alternative school or alternative school-type programming for village schools. After conducting the research, I discovered two different ideas being discussed and considered in these communities. One idea was to have a program separate from the current high school program in which struggling students could be placed, and the other idea was to modify current school structure and programming for all students to more closely align with some methods of alternative schools. Clearly the goal was to enhance student success through student retention and graduation by

creating alternative ways to engage and meet the needs of students struggling with the current compulsory system. For me, it meant an opportunity to examine how local communities thought about resilience in their youth. In other words, through fostering resilience at an individual level – creating or enhancing protective factors – via learning that there would be success. How did the schools' administrators, teachers, and parents view the students? What did they propose and how did that match up with what the literature tells us about resilience in youth?

4.3.2 Alternative School Definition

The word "alternative" in the scope of education or schooling has come to encompass a wide swath of schooling options including almost everything outside of the mainstream public neighborhood schools. This includes charter schools, private schools, religious schools, and the more familiar safety-net type alternative school for underserved or underrepresented students. In order to address the needs and desires of the district, parents and students, and to complete the study in an efficient manner, I initially limited the scope of this study to the historical definition of alternative schools for underserved students. However, after further research into village schools starting the process, I realized there is important knowledge to be gathered from the other "alternatives," especially how they address Indigenous, rural, and community schooling. As an aside, historically these student populations have been labeled as "at-risk," which squarely places fault on the individual student, family or community without addressing the larger educational context and/or system/institution that has as much to do with lack of success as with any student or family difficulty. I will instead use the terms underserved or underrepresented to describe the populations of students whose needs are currently not being met by the public school system.

4.3.3 NSBSD in Pursuit of Alternative Programming for Village Schools

Communities and school boards of these two villages have asked for an alternative to the current school programs being offered, like Kiita Learning Community in Utqiaġvik. The difficulty in this proposition is that smaller school budgets and much smaller student populations in villages limit the capacity to establish "village Kiitas." So what might be done instead? The village schools are poised to capitalize on their smaller student populations to re-envision their schools as alternative school programs. A common aspect of alternative school successes visible throughout the research is the necessity of lower student-to-teacher ratios, which are already in place in village schools. How might the North Slope Borough School District (NSBSD) best capitalize on this to improve outcomes for students?

4.3.4 Alternative School Models as a Useful Choice in the Pursuit of Supporting Greater Levels of Graduation, Proficiency, and Success

Alternative schools provide extra support for students' success and the good news is partial aspects of these types of support are currently in place in village schools. Through some tweaks and student input these aspects of the current system could be better used to have a greater impact on student success, proficiency, and graduation. The Iñupiaq Learning Framework is one such tool currently in place. School sites will have better inventories and understanding of necessary elements of alternative school-type aspects already in place. This report will be a useful tool in understanding how to encourage the growth of additional student and learning supports and protective factors from local school site knowledge and the literature around alternative school-type programming.

4.4 Literature on Alternative Schooling Practices

Given this approach by the school district, I directed my literature review towards learning what circumstances cause other school systems to adopt alternative schools or programs and how these circumstances are related to what I saw in the North Slope Borough School District (NSBSD). I also wished to find out what solutions have and have not worked in other locations, so that by comparing circumstances in other alternative schools to those in the NSBSD, I could evaluate what practices could be applied to village schooling in the NSBSD. The following is not an exhaustive review of scholarship on the subject, but rather a narrow review addressing the most pressing concerns. The review moves from the historic specifics of alternative programming to general alternative school qualities, then to the specifics of meaningful practices of alternative schools that might best inform the process for village schools in the NSBSD.

Alternative Education as a Quality Choice for Youth: Preparing Educators for Effective Programs (Kochhar-Bryant & Lacey, 2005) brought the basics of alternative school students, programs and the teachers to the forefront. The impetus for initiating an alternative school typically revolves around the need to support students who are at risk for a number of undesirable outcomes, such as dropping out, suicide, and/or drug and alcohol abuse. "At-risk youth have complex needs and require a more intensive educational and support program" (Kochhar-Bryant & Lacey, 2005, p. 110). There is a concern that this type of alternative school programming will be carried out at the expense of the high-achieving students. Alternative schools should be designed to support all levels of students regardless of the level at which they come to school. From the gifted student to the student who lag behind their peers, the aim of alternative schools to better support underserved students is not necessarily a barrier to all

students achieving higher levels of learning and skills. White and Kochhar-Bryant (2004) found that "research has shown that quality long-term alternative education programs can have positive effects on school performance, attitudes toward school, and self-esteem" (109). The program and instructions are individualized and differentiated to meet learners at their level and to move them forward. With the small class sizes and the individualized instructional model that alternative school models employ, all students' learning can be supported, self-monitored, and capable of generating success. "Alternative" has recently become synonymous with innovation in the refashioning of high-school education.

Given the needs in these boroughs for young people to be both present in "Western" schools as well as on the land (or waters) with family and others for Indigenous practices, any "alternative" must educate young people in a flexible manner that combines public school standards of learning with their day-to-day culturally-focused activities. A combination of two models drawn from the Kochhar-Bryant and Lacey (2005) article are of particular interest to remote rural village communities, such as those of the North Slope and Northwest Arctic boroughs:

> *Restructured Schools.* These schools, progeny of the early free schools, may start as early as the primary grades. They bring progressive educational principles to a wide population of students. Some have endured since the 1960s. Many of the new charter schools opened since the early 1990s have adopted a similar child-centered philosophy. Although not specifically designed for at risk youth, these programs often incorporate ideas that work to the advantage of students who are struggling in mainstream schools.
>
> *Problem-Solving Schools.* Alternatives specifically designed for at risk students, these programs tend to be non-punitive, more positive and compassionate for students in need

> of extra help, remediation, or rehabilitation. They often provide a network of academic, social, and emotional assistance to students who have been unsuccessful in the mainstream. (p. 112)

The child-centered philosophy of the restructured alternative learning program is remarkably similar to how village schools might be rethought. Also, the specificity with which the problem-solving school addresses students' needs for a support structure could serve to inform the development of a model informing NSBSD village schools.

An Overview of Alternative Education (Aron, 2006), produced by the Urban Institute and written by Laudan Y. Aron, compiled a list of attributes gathered from the literature concerning alternative school successes. The Urban Institute "builds knowledge about the nation's social and fiscal challenges, practicing open-minded, evidence-based research to diagnose problems and figure out which policies and programs work best, for whom, and how." The Urban Institute "gathers data, conducts research, evaluates programs, offers technical assistance overseas, and educates Americans on social and economic issues — to foster sound public policy and effective government" (Aron, 2006) So although *urban* in name, *The Urban Institute* contributes valuable information to rural policy as well. Village schools are nimble enough to capitalize on the successes of the alternative urban schools.

In the *Overview*, Aron defines and classifies alternative education programs, profiles the kinds of students involved in alternative programs, and examines policy implications for alternative schooling. Below is Aron's "Preliminary List of Noteworthy Attributes of High-Quality Alternative Education Programs:"

-*Academic Instruction*: Successful programs have a clear focus on academic learning that combines high academic standards with engaging and creative instruction and a culture of high expectations for all students. Learning must be relevant and applicable.

-*Instructional Staff* Instructors in successful alternative programs choose to be part of the program, routinely employ positive discipline techniques, and establish rapport with students and peers.

-*Professional Development*: Successful alternative education programs provide instructors with ongoing professional development activities that help them maintain an academic focus, enhance teaching strategies, and develop alternative instructional methods.

-*Size*: Many alternative education programs are small with low teacher-to-student ratios, and have small classes that encourage caring relationships between youth and adults.

-*Facility*: Effective alternative learning programs are in clean and well-maintained buildings that are attractive and inviting and that foster emotional well-being, a sense of pride, and safety.

-*Relationships/Building a Sense of Community*: Successful alternative education programs link to a wide variety of community organizations and the business community to provide assistance and opportunities for participants.

-*Leadership, Governance, Administration, and Oversight:* Many studies highlight the need for administrative and bureaucratic autonomy and operational flexibility.

-*Student Supports:* Successful alternative education programs support their students through flexible individualized programming with high expectations and clear rules of behavior. They provide opportunities for youth to participate and have a voice in school

matters. Structure, curricula, and supportive services are designed with both the educational and social needs of the student in mind.

-*Other contributing factors* include clearly identified goals; the integration of research into practice in areas such as assessment, curriculum, and teacher training; the integration of special education services and English Language Learners; and stable and diverse funding. (2006, pp. 12-13)

Of course this list of attributes is general to the mission of an alternative school program on a broad basis. While these lists and data sets can help guide the process of developing how a village alternative school program might effect change for students, each site will likely differ in process and development. The last section of the publication speaks to funding, which is of interest to grant coordinators and business offices. Alternative schools often rely on partnerships and/or sponsors to supplement programming or funding.

The Study of Effective Alternative Education Programs by Quinn and Poirier (2006) was the first methodological examination of the characteristics of successful alternative schools. The authors found that effectiveness in working with underserved students was key to exemplary programs. The reason this study is so important and credible is that the researchers selected only programs with available data on the effectiveness of the program in producing results for students. To get at the root of alternative school program success, the authors quantitatively and qualitatively examined three alternative education systems as in-depth case studies. The three programs produced increased attendance, student motivation, performance, overall quality of life, and parental satisfaction and participation in the programs. These aspects were frequently cited by village stakeholders as reasons for their interest in pursuing alternative school programming.

There were common findings in school characteristics across the three schools that would be important to consider as the NSBSD considers adopting alternative school methods for village schools. It is noted that many of these alternative school characteristics are still in need of rigorous empirical study because a cause and effect linkage has yet to be established. This would answer questions such as: do these characteristics in fact produce desired outcomes, or are they actually dependent on a different process, such as school restructuring or teacher efforts? Quinn and Poirier (2006) add the following to Aron's attributes of alternative schools (listed above): (1) Flexibility, (2) Choice, (3) Parental involvement, and (4) Collaboration. A person familiar with school administration would notice that most of the characteristics on these lists are the important contributors to the successful educational process in most schools. However, the degree to which any school setting can practice them – can create iterative and effective processes to develop and maintain these characteristics – is what matters.

> However, it is our opinion – based on our site visits, and quantitative and qualitative findings – that these characteristics exist with greater intensity and play a more significant role in the effectiveness of the alternative programs we studied. In particular, effective classroom management, flexibility, small class size, and staff collaboration are embedded in the philosophies of these programs and are integral to their identities and approaches to effectively serving their students (Quinn & Poirier, 2006, p. 16).

This research is significant to the challenges of Alaska's rural and village schools because the authors link the characteristics of successful alternative schools and the communities of these schools. Most of these variables are contextual and relative to the sites, personnel, and students inputting time and energy into these efforts. Success requires capacity-building, broad

stakeholder input and action, and distributive leadership that is constantly monitoring, tuning, and improving processes based on progress and outcomes. They write:

> In addition to the aforementioned characteristics, four characteristics are less frequently discussed in the literature on alternative education but remain worthy of mention as potentially important characteristics of effective programs. As such they also merit more investigation. These additional four characteristics include:
>
> - Community support
> - Targeted to a specific population
> - Administrative leadership
> - Transition support (Quinn & Poirier, 2006, p. 16)

These qualities seem fairly evident when thinking about successful schooling at the secondary level. What makes each characteristic so vital? First, community support took a different shape in each case study, although significantly, all programs had established relationships with local police and probation officers. Stakeholder opinions also varied as to the ideal extent of community support and ultimately was a vital aspect that needed balance set by school leaders and recalibrated as needed and by other participants in the system. Communities and schools, in particular in rural locations share a role in local-scale resilience. At the community level, Wright's (2004, 2007) work in New Zealand and her extensive review of other rural schools demonstrated the capability of such schools to reenergize communities and to serve community-wide social hubs that can positively affect adults as well as children. Wright notes the "inextricable linking of a school with its community not only allows, but also actively encourages social connectedness…the school's inseparability from its community ensures not just the school's survival, but the community's survival as well" (2007, p. 355). While I use

Wright's work in chapter 2 to explain why compulsory schools are forms of governance, her points are also vital to understanding alternative schools (or practices). When communities, especially those of fewer than 100 (such as in villages), design ways to educate all students and to include them in the local definition of community success (resilience), it can positively reinforce the self-esteem of each child served. This is especially important in developing ways to align communities' and school systems' definitions of success.

Second, while schools in a democracy have been envisioned to treat all students equally, we know that this is not always the case. There are specialized programs in regular city schools across the U.S. for children who are differently abled or underserved. across the U.S. When considering equity and underserved populations in Northern Alaska, there must be an emphasis on Alaska Native students and their learning outcomes, centered on developing programs to teach curricula in culturally significant ways that combine school learning with the cultures, languages, practices and livelihoods of their families. Bergstrom, Cleary, and Peacock (2003) examined factors that fostered resilience in 120 Native youth in the United States and Canada, and that connections to parents, community, teachers, and schools were major contributors to resilience common amongst respondents. A large majority of the youth also cited connection to their culture as a key factor; this grounded-ness in home culture allowed for confidence in crossing between home and school culture. Additionally, these Native youth also cited participating in a culturally responsive or sustaining school curriculum that included their Indigenous culture, history and language as a source of resilience. In short, there is great benefit in targeting a specific population when the "target group" has its own social input into how its members, in this case Indigenous students, are treated. Shaw (2013) notes in her research with the Dena'ina youths of Nondalton, Alaska that this type of structural generation gap created by

compulsory schooling, by the school itself as barrier to youth well-being, is an obstacle in need of analysis, decolonization, and revitalization with an Indigenous lens. For example, language revitalization efforts and the teaching of Indigenous history are two often-promoted means to give Alaska Native students the confidence to feel that their identity is fully valued, – regardless of their scores on standardized tests.

Quinn and Poirier's (2006) third point concerning administrative leadership, applies both to administrators and other educational leaders such as teachers and school staff. Johns et al. (2000) note the vital importance of leadership as it contributes to rural schools. Similar to Wright (2007), Johns et al. found that the literature overwhelmingly indicates rural schools are community hubs

> …not only do schools educate youth, but they perform a myriad of other functions within their communities, from providing physical resources such as facilities and equipment, to involving community members in the academic, sporting and cultural activities of the school, to encouraging youth and community members to work together to develop a greater understanding of their community and its potential (abstract).

In Quinn and Poirier's pilot study, leadership is prominently identified and discussed as integral, noting that "school-community alliances" must be maintained. In other words, schools must work with government agencies, funders, community members, elected officials, and others to gain funding and to secure other favorable outcomes (e.g. parental involvement). They write "while there seems to be no set of universal characteristics which define successful leaders, the literature suggests that they are likely to be skilled in communication, building trust and empowering others, and in collaborative goal setting and problem solving (2006, p. 7).

Leadership turnover is a longstanding problem across rural Alaska, as noted in chapter 3.

The last factor here, transition support, refers to how the school system, alternative school, and home school support students transitioning between the two schools. This transition or reintegration process varies from case to case. In the small communities of the NSBSD, counselor and family involvement could support transitions. The process would require modification to address a student's psychological, emotional, cultural and intellectual needs, as well as the resources and human capital available at each school or village. This study validates many characteristics of successful alternative programs that have been cited throughout alternative school literature. Although this study is preliminary in the research canon and limited in scale, this is one of few studies that contain substantial data sets to support claims as to what works in educating underserved students.

Savage et al. (2011) support the idea that teaching practices should be responsive to the cultural identities of their students, but offer less clarity regarding both the specifics of culturally responsive pedagogies and of effective strategies for implementing them in classrooms. Using a mixed-methods research approach, they evaluated the impact of teacher professional development to instill and develop culturally responsive pedagogies in secondary classrooms. Their results are reported based on systematic observations of over 400 classrooms at 32 mainstream schools across different subjects and on interviews with 214 indigenous Māori students. The majority of teachers showed evidence of culturally responsive practices, and students were able to describe examples of teachers caring for them as culturally located individuals, but they concluded that changes in teaching practices are not enough.

In *Lessons from Successful Alternative Education: A Guide for Secondary School Reform* Bland, Church, Neill, & Terry (2008) examine a single school district, Central Kansas Dropout

Recovery Centers, and identify the factors that allow dropout recovery programs to succeed with students who were underserved in their local public school setting. Of use to Northern Alaska alternative school planning, the study also identifies strategies that are useful in preventing student failure, which is the ultimate goal of the alternative school programming charge. The authors examine the causes behind students' decisions to drop out. In particular they found that when students had to take on adult roles, for example providing for their families, this made for difficulties in the non-alternative school setting. They also noted peer pressure and issues of substance abuse, but these are problems in both types of schools as well. What made the most significant impact on me was that their study indicates that often the students who dropped out felt high school staff pushed them out – but the high school staff in the study never indicate, they could be at fault. Consciously or unconsciously, teachers and administrators communicated to certain students that they did not belong in high school. In locations with high staff turnover rates (as described above), this problem may be exacerbated in cases of students experiencing temporary conditions that negatively impact their school performance. A student may struggle for a few weeks one year and come back and have their problems in the following year. Often for new teachers, of which Northern Alaska schools have many, the path of lease resistance is to counsel a student out of the class. But, without a consistent set of educators no one might know that this student can succeed if given a supportive environment and flexible time parameters. The authors make several suggestions to avoid this dropout bias. Schools should "insure that students engage in and learn a meaningful curriculum" that is relevant to their lives, the staff should be "caring" and support "each and every student's learning," flexibility should be increased and rules reduced, and schools should not let students fall behind – rather they should make "learning time a variable within the school structure" (Bland, Church, Neil, & Terry, 2008, p. 37). They

reiterate this point about control and respect in their work, pointing out that relationships created in the schools should be founded on "mutual respect, known learning standards, and teamwork rather than hierarchy, competition, and control."

Jeffries and Singer (2003) address some of the difference in strategies when educating urban American Indian students, in contrast to rural student populations. They focus on a single school, Black Raven, which serves students ages 14-18 who have dropped out or are at risk of dropping out of the local public schools. The Black Raven School integrates Indigenous culture into its curricula and works to coordinate community services with students and their families. The authors note that this sort of school's prioritization of *students' needs*, over for example the needs of administrators to have the school open and close at a specific time, is the cornerstone of the alternative high school model. I would argue it also reinforces the points that students and their schooling are integral to their communities. Several school attributes that have enhanced Black Raven's success are relevant for Northern Alaska schools, in particular because they are already a part of programming or discussion in those districts: "(a) small school size, (b) flexible school formats, (c) governance structures, and (d) culturally responsive teachers." As I find in my own research explained below, this indicates that responses from my interviews correspond strongly with what has been proven to work for other Indigenous populations.

For the fieldwork portion of this pilot study, I flew to both Point Hope and Point Lay in October 2012. I stayed in Point Lay for three days, sleeping in the classroom that once housed Home Economics. It should be used for exactly that, but now it houses itinerant school support staff and others on "official" business. I began with the principal, Glenn Cole, and utilized snowball sampling to generate the six other survey interviews. I was able to interview three students at Kali School in Point Lay, though the students were reluctant as I was an unknown

entity to the community. A follow-up opportunity to survey students at another time would likely produce more participants and greater depth to the qualitative data. In total I interviewed eight, one teacher, one paraprofessional, one NSBSD employee, and the school's administrative assistant, a well-connected community member- in addition to the students and principal mentioned previously. In Point Hope I stayed in an apartment attached to a machine room, behind Tikigaq School for four days. I again began with the principal, Gregg Wilbanks, and followed the chain of command to an assistant principal and a counselor who had both been with the school for over ten years. After these initial interviews, I again snowball sampled to identify more interviewees. I also made myself publicly available in the main office, in the cafeteria and near the copy machine, all prime sites for interactions. I applied my own knowledge of education to the task of corralling interviews; I have worked in some capacity at over thirty schools over the course of my career as a teacher, literacy coach, and researcher. Outside of the administrative staff, I again interviewed the school's administrative assistant, who proved a wealth of knowledge and information, as well as five teachers, two paraprofessionals, and four students, and I also conducted a focus group with a class during their study hall. Overall, my interviews were focused on and derived from this key question: How can alternative educational programming be implemented to foster student success and lower dropout rates? Interview templates and raw data are included in the appendices at the close of this document.

4.5 Results

Students are dropping out and failing to complete their high school education at an unacceptable rate in village schools in NSBSD:

2010-2011 Statewide dropout rate 4.7%, 2779 students,

2010-2011 NSBSD dropout rate 11%, 73 students.

4.5.1 Kali School Data (Based on data from Kali School in Point Lay, Alaska)

Kali School had 17 students in grades 9-12 in 2011. During the school year, 2010-2011, the graduation rate was 25%, and the dropout rate was 6.9%. 30-40% of students were assessed as proficient on the annual Standards Based Assessment (SBA) across all grades in reading, writing, and math. Two students graduated from Kali School in 2011.

4.5.2 Key Findings for Employing an Alternative-type Program in North Slope Borough Villages

Below are the key findings from seven interviews (1 teacher, 1 administrator, 1 paraprofessional, 1 community member and 3 students) conducted during an on-site visit to Kali School in Point Lay, October, 8-11, 2012. These interviews revealed the following trends in thinking related to the question, How can alternative educational programming be implemented to foster student success and lower dropout rates?

People *– The involvement of a broad cross-section of people working together is likely to facilitate the success of an alternative programming effort for schooling in the village.*

-Bring in **elders** to talk and work with students

-One-on-one time is important to students who struggle. If possible teacher and/or support personnel should find time to meet with each student individually every day.

-Finding ways to get **students outside** of the village bubble is key to broadening students' horizons, setting their goals higher, and motivating them to behave, contribute and work in village alternative schools.

-Also key is finding ways to **bring the community into the schools** to impact alternative school programming. Students need to see models of success from their community.

-Parents and communities are often **latent supporters** of the educational system. Each school community needs to develop strategies and ways to compensate for this latency, somehow. Brainstorm and innovate. For example, get more entities involved in the school like NSB Fish & Wildlife, Iḷisaġvik College, ASRC.

-Develop events as **bridges** between community and teachers and vice versa.

-Teachers and administrators have a whole lot more to offer than they are given **credit** for.

-There is a need for a can and will do **attitude** as well as the belief students are going to succeed.

-**Empower** the children—functioning is possible, everything has to be done alternatively. Comes down to the teacher and how they connect with the kid. How best is this connection built?

-**Sense of belonging**, pride, teamwork, spirit, camaraderie, and school spirit/song is important.

-Greater **collaboration** facilitated amongst village alternative schools to share ideas, learnings, struggles, and triumphs.

Structure – *Redesigning school system structure can produce a learning environment more responsive to all student needs and help provide a supportive network to identify and retain students at risk of dropping out.*

-Experiment with daily **schedule,** school calendar, cultural calendar, for example, an extra class at end of day, longer classes for students who need extra help with the work, one room schoolhouse for all high school teachers with break-out rooms/courses over course of the day.

-Drug and alcohol use/abuse are prevailing problems in school and in community which necessitates professional **counseling** at school sites in order to address this barrier and other related barriers to student achievement.

-There is a need for **extra-curricular or co-curricular activities** for students to engage in after-school besides open-gym. School needs to be fun again. Where did we lose the fun?

-Bring in **electives or more high-interest classes** like shop, home economics, or subsistence-based courses, also art, music, or choir classes as part of the alternative curriculum.

-Mainstream and collate **district initiatives** to synthesize a systemic program, instead of fragmented, that positively affects student growth and achievement.

-District is a **level 5** in need of improvement district and has limited opportunity to play or fine tune structural or programming issues.

-To employ an alternative-type curriculum at village schools it takes the **input** of students, school staff, and the public including families and community members to develop a useful and successful alternative school program.

-In planning and taking action on alternative school programming it should not be just getting a few ideas and running with them but rather **gathering support** to refine what has been contributed, to make a plan based on desired future outcomes, and then creating a mechanism to routinely revisit the plan and measure success and retune process.

-**Balance** student needs with school needs with community needs

Programming *–Alternative school methods rely on rethinking how schooling/instruction takes place, maintaining what's currently working but taking an alternative approach to what is not facilitating student success.*

-**Set expectations** for work at the beginning of the week

-Students working at own **pace** and on some of their own terms are key aspects (some ownership over individual education process).

-Appropriately **pacing the learning** and lessons based on student abilities is important. Students who struggle or lack skills or competencies often have a difficult time compartmentalizing and need either more time or single track learning to better support their achievement goals.

-Like the alternative plan every child is different, the more **individualized learning** is the more success will be demonstrated.

-**Reading** intervention/instruction/support is vital and important.

-By the time students are at the high school level, their **reading abilities** span many different reading levels from elementary to college and instruction and learning in an alternative program needs to be designed to address and accommodate these varied levels of reading proficiency. For example, reading out loud can be a very defeating task for students who are below grade-level in reading. Reading out loud often completely shuts them down from ever moving forward.

-Vary **instructional strategies** to include learning by watching what others do instead of explanation and learning by doing, engaging in the activity or work.

-**Inupiaq program** remains an important aspect of educational program.

-Since leaving the village is not for all students, students need to be engaged in their own process of **defining success** on their terms, school personnel are in the business of expanding those visions.

-**Real life-based work** can be powerful motivator and the students need the responsibility that comes with taking something like a project on to stay the course of adult-mandated educational outcomes.

-Incorporating **practical life skill** instruction is helpful, for example, filling out forms, interview experience and the like without forgoing academic rigor.

-Alternative school programming should be based on **individual student's needs** and interests but not at expense of basic academic needs.

-**After-school learning** supports like tutoring, mentoring, homework help, study groups would benefit students in alternative-type learning program.

4.5.3 Tikigaq School Data (Based on data from Tikigaq School in Point Hope, Alaska)

Tikigaq School had 37 students in grades 9-12 in 2011. During the school year, 2010-2011, the graduation rate was 66.67%, and the dropout rate was 14.71%. 34-43% of students were assessed as proficient on the annual Standards Based Assessment (SBA) across all grades in reading, writing, and math. Ten students graduated from Kali School in 2011. A comment from one of the Alaska Native teachers concerning those that did not succeed in the school, "Still Walking Around." This seemed quite emblematic of the school missing the mark and folks not knowing what to do.

4.5.4 Key Findings for Employing an Alternative Program at Tikigaq School

"Inupiaq culture is most important and first and foremost. It's unique, still going. We're here and we're open to other people." -Emily Lane (teacher)

Below are key findings from 16 interviews (5 teachers, 3 administrators, 2 paraprofessionals, 2 community members and 7 students) that occurred at an on-site visit to Tikigaq School in Pt. Hope, 11-16 October 2012. These interviews revealed the following trends

in thinking related to "how can alternative educational programming be implemented to foster student success and lower dropout rates?"

People- *The involvement of a broad cross-section of people working together is likely to facilitate the success of an alternative programming effort for schooling in the village.*

-They used to bring the students to the **elders** in the morning to do work for them and for company. Worked out well for both sides. Students got mentorship; elders got company and work they needed done. Students would then reflect on the experience when they got back to school. Elders were happy for visitors and the student's time to catch up on work

-Once students fall behind, it is not just an academic issue but also includes emotional, developmental, mental, and physical **issues** and an alternative school/program must cope with these as well.

-Alternative programs need **teachers so well versed** in their fields and pedagogy that they already know what the kids don't know, a certain depth and desire to make it work. Alt School requires teachers who connect well personally and culturally with students, who motivate and encourage.

-Alternative programs provide the **1-on-1 time** students need.

-Develop activities that **bring the accomplished/successful community members back** to talk to, mentor, and influence the students.

-An alternative program would need to reconnect with Barrow so that there is an understanding of what its students need, including more meeting halfway and working together to alleviate the lack of trust, faith, and respect due to lack of listening & response.

- This program would require more **teacher involvement** in community and more **community involvement** in schooling to create the community of learning and support.

-Develop a **student-to-student mentoring program** between older and younger students.

-All stakeholders must take an **active role** in the process, building on the small victories, instead of piling on the failures.

Structure – *Redesigning school system structure can produce a learning environment more responsive to all student needs and help provide a supportive network to identify and retain students at risk of dropping out.*

-Alternative School (AS) requires a **separate place**/space for older students in the program. It needs its own identity separate from the main school, own setting, in the Qalgi, up the river, out of town, wherever or a self-contained addition, more adult-like and less student-like. AS is a way for students to get their diploma and be in with older kids, separate entrance, consider possibly a student dorm next to school for kids to stay away from house with mother and father, no questions asked

-Reliable **childcare** would support continued success of the students.

-AS need **peace and quiet** to accomplish successful outcomes.

-AS needs to consider what we are **feeding students** and its subsequent effects on school performance.

-AS helps students to find a **balance** and/or navigate a pathway for themselves.

-AS could house Inupiaq language and culture classes as well as parenting classes at night for **community learning**.

-AS needs a **structured environment** with consistency; the only **flexibility** should be to meet individual learning styles and in scheduling adaptive to student needs.

-AS should have **Monday meetings** everyday. These are check-in meetings where students and school staff develop rapport around day's work and activities.

-AS is **student-centered** and built around needs of students 1st and needs of adults 2nd.

Programming *Alternative school methods rely on rethinking how schooling/instruction takes place, maintaining what's currently working but taking an alternative approach to what is not facilitating student success.*

-AS has **different curriculum/pedagogy/climate** from the norm.

-AS needs the **capability to patchwork and catch-up** a variety of literacy and writing skills and other learning/coping strategies to address the struggle of not being equipped to learn at grade level.

-AS need to consider the possibility of **job training** as an integral aspect, it's elsewhere why not here?

-AS students get more **individualized instruction** and can get what they need from school, invoking more enthusiasm about school from students.

-AS should not be like a GED program, because it did not work. Students came in at very low skill levels, i.e. literacy.

-**Alcohol and drug use/abuse** is a problem, how can an AS mitigate some of those harmful influences? Health class is important piece of AS, every year.

-AS must clearly state the **nature of the responsibilities** so that students are empowered to do more for themselves and not rely so heavily on transient school staff or latent parents. How much can students do it and more for themselves?

-At AS concepts like responsibility and **accountability** need to be operationally defined.

-AS ensures that **teacher creativity** remains vital part of the equation.

-AS requires **administrative involvement** and support for alternative school.

-AS needs more **after-school activities** and opportunities to travel outside village, clubs.

-AS needs electives and choices that prepare students for **life after high-school**, computer class, driver's education class, music, dance, voice/singing

-**Inupiaq program** is an important piece of the AS program.

-**Personal/self-esteem** building is important piece of AS program.

-AS has math and reading skills emphasis.

-AS teachers need to have the **freedom to innovate** and flexibly address student needs sometimes outside of state and school district mandates.

-AS students **demonstrate competencies** on various skill-sets rather than being evaluated being based on seat-time.

-The district focuses on the **what** (content) of the teaching, let AS focus on the **how** (process), meaning less reliance on strictly content more focus on the process for AS. Let AS continue to teach the mandated standards and aspects of ILF but allow individual school sites to navigate how that teaching and learning is carried out on-site.

-AS needs to show students life after high school, through curriculum units or a class, show students examples of **how to be successful**, what they can do to be successful, show statistics

that demonstrate what life will be like and real life examples of what it's like with children on a low-income. AS does a better job illustrating to students why education matters.

-AS could usefully employ **computer** aided supplements or a technology-based program.

-AS uses different methods to reach the goals/outcomes but still demands the necessary **rigor** and **self-discipline** for students to graduate.

-AS utilizes **Understanding by Design**-based lesson planning and assessment.

Process- *The process in developing an alternative school to address student needs requires empowerment, buy-in and participation by all stakeholders.*

-First we need an evaluation of **how things really fare** on the ground. We suggest interviewing the ones who have dropped out to see what their needs are; we need to include them to find out what they need and want. This may also encourage them to reenroll.

-As part of a possible pilot program this could possibly start next semester as a **credit-recovery class** within current school programming to be expanded next school year under guidance of stakeholders.

-In the process of developing AS we need to **prioritize** as well as have flexibility in the scheduling to find what works.

-Human Resources and hiring are keys to success in alternative schooling. **Personnel** with a proven track record and a willingness to take on a challenge will produce the best results.

-The ongoing development process must look at the kids that need it as their **needs change** from year to year. Assess staff to see who would fit the bill perfectly—run program administration on extra-duty contract, matching and creating class environments for students' needs.

-AS must relentlessly find ways to help people finish. The can-do/must-do attitude is a school wide obsession.

-In an AS **students have some voice** and therefore some buy-in.

-Be **inclusive** of parents, religious leaders, teachers, principals, counselors, and elders in the development of the AS at some point but maybe not throughout.

Additional Considerations- *Observations elicited from respondents that are important to keep in mind when developing AS program.*

-Students don't make it in the mornings.

-AS should be fun.

-AS should keep students out of criminal court system, as well as support parents.

-Somehow quitting is acceptable.

-We could do creative things—make things stellar, (innovate).

4.5.5 Alak School in Wainwright AK, NSBSD- Interview with Teacher Frank Pickett

One location I did not visit but was able to investigate was the Alak School in the village of Wainwright. I include this example because it demonstrates that there are numerous avenues to enhance student success, and they need not be funding- or personnel-intensive. Frank Pickett has been running a two-period ($5^{th}/6^{th}$) end-of-the-day credit recovery program since 2009-2010, and has produced "several successes." The numbers provided by Mr. Pickett show that in the first year of the program he had 15-17 students start the class that year, but only two or three actually "took off on the work." It seems the program is having some limited success but for it to

continue to be funded or to be reproduced at other village school sites, it would have to show a better than a 13% success rate. Pickett says key to the program is student contracts:

> Parents, student, administration, and all teachers involved met with each of the students and signed contracts as commitments for being in the program. The contract stated that they could not go back into the regular classes until they had caught up or shown that they were going to catch up. (F. Pickett, personal communication, November 3, 2012)

For Mr. Pickett, the most important factor to keep in mind as the district considers plans to implement alternative-type school programming relates to students taking responsibility for their schooling.

> Number one is student understanding that they must make the decision to accomplish what is necessary to graduate. Hopefully knowledge will also be gained. But ownership of attitudes and working toward goals is their responsibility. We have a "list" of levels of responsibility that I found while visiting an alternative school in Anchorage, Benny Benson. We go over the list and encourage them to read it often and be at a high level of responsibility in their lives. We do other encouraging, short presentations at least once a week. We also go over their Grad Progress Report often. The student must understand that their actions determine consequences and that work is rewarded. (F. Pickett, personal communication, November 3, 2012)

These aspects of student ownership over their learning, and defining success and consequences collaboratively with school personnel, are repeated throughout the literature documenting alternative programs that have been successful with student populations who are underserved and have a higher likelihood to drop out.

4.6 Analysis

As noted earlier in Chapter 2, schools are politicized and publicized environments that in rural locations often serve as "the glue that binds together small communities, serving as their economic and social hub" (Jimerson, 2006, 5). As these alternative schooling studies indicate, the inclusion of diverse ways of knowing, in particular Indigenous ways of knowing, can enhance student success and re-engage students who have not found success in mainstream public schools. Education prepares students for uncertainties in social-ecological systems and different types of curriculum shape how students learn to problem-solve, value natural capital, and relate environments to economic and cultural systems. Alternative schools, or including alternative schooling practices can have a direct hand in promoting greater well-being and diversity of coping strategies for individual students as well as the broader community.

Alternative schools provide extra and specialized support for students' success and the good news is that partial aspects of these types of assistance are currently in place in the two village schools. It is possible to work within the current system to better use ongoing programming, alongside implementation of new methods to facilitate greater progress in student success, proficiency, and graduation. For example, the Inupiaq Learning Framework is one of these tools currently in place that has likelihood of success, but its success hinges on successful implementation through district support and dexterous coordination with ever-changing state standards. Each community has the best access to their inventories and understanding of what is in place and should be encouraged to develop their own engagement in the schools to address the development of alternative programming. My pilot study is a useful tool in assessing what is in place and how to encourage the growth of additional student and learning supports from local school site knowledge and the literature around alternative school programming. But, this report

can only evaluate and encourage from a "bird's eye view." Capacity on the ground needs to be developed to take full advantage of the latent potential for alternative programming in each school.

Alongside the school board's interest, there has been a call from communities to have a village alternative to current schooling in the villages. Villages would like a Kiita Learning Center of their very own. The difficulty in this proposition is that school budgets and much smaller student populations in the villages limit the capacity to have "village Kiitas." So what might be done instead?

4.6.1 Alternative School Elements Applicable to Village School Sites

1. The ideal situation for an alternative program includes a pull-in aspect. An attempt to pull-in or recapture the students who have dropped out previously in addition to the students who are underserved and may drop out of school.
2. Literacy intervention at multiple levels will be a necessary aspect of whatever program is employed.
3. Need for district oversight flexibility in order for school staffs and communities to explore potentiality of alternative school programming.
4. Students do not come to school for standards-based instruction. Students attend school for the extras. All alternatives should include provisions for getting shop classes, home economics or other elective classes on line. There is the possibility in scheduling to create room in schedules for teachers to teach electives.
5. Whatever alternative program or aspects of alternative programming that are employed must be sustainable, so that when staff turnover is 30-60% or more, the baton can easily

be picked up and carried forward. Sustainable, reproducible, successful and adaptable without necessitating staff retention.

6. Curriculum units centered on subsistence, vocational, and home economics with regular health units have greater relevance for students and have a better chance of keeping students engaged.
7. Alternative schooling needs a foundational basis in the cultural calendar. To facilitate, compromise with school staff for breaks that better fit their needs like a 12/7-1/2 winter break. Find the ways to advantage students and school staff. There is a need for serious reevaluations of the daily schedule and annual calendar to develop time that works for students and school staff. Central district and the school board support and facilitate these efforts.
8. Flexibility in work deadlines and classroom structure but firm expectations of accomplishment, achievement, and accountability.
9. Mastery modules of instructional strategies and proficiency packets of student work competencies, not simply worksheet packets but summary authentic, student's life-based assessments.
10. Develop option of computer based supplemental work. Technology should be integral aspect of alternative school programming.
11. Professional Counselor/counseling at each school site, full-time if possible, part-time/itinerant if budget constraints. No alternative matters if students cannot mitigate issues from home, society, and environment. This is a difficulty of the educational situation in the North Slope communities but without addressing it forward movement on the issues of student success, proficiency, and graduation is difficult, at best.

12. Students should be the monitors of their own progress instead of teachers handling the whole process for them. For example, develop a student-user-friendly Equifax-type Credit Report for students so they can real-time monitor progress and a Student Learning Plan that is actually student-centered and not Teaching Intervention centered.
13. Seems there is a real need for visionary leadership and facilitative leadership to have this type of alternative program produce results.
14. Students need more attention and accountability, sending them away usually does little to address the problems. Sending kids away from home just seems to push them towards further alcohol/drug abuse in order to cope with the pain of being away from everything they know. Other negative behaviors manifest stemming from boredom, not fitting in, making name, angry, nothing to lose. The best solution is finding a way to make the local school function at a high level, if at all possible.
15. School engagement with local justice systems to address whole student issues comprehensively. Solicit input of tribal courts in developing outcomes for individual students and some school-wide outcomes. Involve other law enforcement personnel, i.e. probation officers, VPSO, troopers etc., in processes moving forward.
16. An alternative school (AS) serves as a transitional place moving students through struggle and forward.
17. AS works on developing alternatives to sexual relationships, pregnancies, and the use of alcohol and drugs in impeding future development of student.
18. AS avails students of the multitude of definitions of success and how they would go about defining and fulfilling their own.

19. Teachers and administrators have the capacity to create this change at the local school site, how can the district office facilitate some of these changes?

4.6.2 Conclusions Specific to Smaller Village School Sites

Because of the lack of student numbers an alternative program would more likely be revamping of what is currently being done. There simply are not the numbers of teachers, students, and administrators or the space needed to have a separate building. Rethinking how school is currently structured and programmed to more closely align with alternative-type programming will improve student rates of proficiency, success, and graduation.

Conclusions specific to larger school sites

In a larger village, like Point Hope, there is the possibility of having a program separate from the current school programming. It may be a 1 period or 2-period class of credit recovery for the spring semester with an expansion of the program next fall after pilot program is evaluated and expanded.

4.7 Implications of Alternative Programming for Alaska's Arctic School Systems

What can we learn from this field research?

Education is a difficult proposition out in the villages and in the North Slope Borough. What is being done now is not working as effectively as it could. Is the difficulty rooted in what has been done previously? It could be but does that mean we, as educators, should just accept the status quo? I don't think so and I would guess the students and most of the community would prefer that more be done and new strategies be tried to encourage a richer educational environment. So what do we do?

Two ideas have come to the fore in terms of change. One has been to adapt more of an alternative type set of programs within the current school system to catch and support underserved students who might drop out. A second is to reorganize the current structure and implement a new school, separate from the original but not unrelated to it in order to provide more effective educational techniques to facilitate student success. One possible advantage for the implementation of either is that small-class size seems to be a prerequisite for a successful alternative school. On the other hand, to start up a separate alternative school in a village could split valuable resources already employed by the school. It seems that integrating effective alternative programming in small village school systems is more likely be successful. So what are the other aspects and how might we go about creating an alternative-type school in the village?

4.7.1 Elements of Successful Alternative Schools

First and foremost alternative program development requires creative, innovative, and compassionate leadership. To truly do this a leader must have on-the-ground knowledge of the community to facilitate an alternative school program that best meets the multiple needs of the specific community. The following aspects are all significantly tied to this type of effective leadership presence, which need not be a single individual, but does need to be a committed person, or persons, over a period of at least several years.

One of the ingredients cited in the alternative-school successes, which is of particular importance to Alaska is a culturally relevant curriculum. The North Slope Borough School District is well on its way to the development of a culturally relevant curriculum with the work around the Inupiaq Learning Framework. Allowing teachers to innovate and develop units

around this framework aligning it with state standards would be a productive method for empowering teachers in the process of instructional design and its subsequent execution. Although this process has been mandated and implemented, the results have been mixed because of uneven implementation efforts and in some cases outright resistance from school personnel (Cope & Hirshberg, 2015).

Alternative school programs success stories regularly mention the importance of the personal connections between school staff and students. Students in successful programs report a sense of belonging that was not present in their previous school experiences. Not all teachers may be initially capable of this connectedness, but it is likely they can learn. We want to consider how the school district can support building these constructs into schools so that newcomers or those without these skills might more quickly acquire them. However it is legitimate to ask whether it is unrealistic to think that these types of interpersonal skills might be taught or acquired.

Alternative school programs require a genuine flexibility in programming in order to find what works for students. Modifications to scheduling like start times, length of classes, or number of classes per day need to be considered to serve students who have not flourished in the mainstream model of six 50-minute periods in a day. These types of changes in programming will necessitate a great deal of flexibility from adults in the school system that may find change difficult to digest. But, building in flexibility can be of benefit to teachers and administrators as well. If student contracts, of the kind noted by Mr. Pickett, can be agreed to and abided by all concerned, reorganizing "school time" could permit flex-time and better work-life balance not only for students.

4.8 Steps toward Integrating Alternative Schooling in NSBSD

1. Meet with current dropouts or GED seekers who can still be served productively by the school, interview them to find out what means might facilitate them finishing the high school requirements to earn their high school diploma.
2. Convene a small investigative group or community of practice to determine how best to move forward on transforming the school to a more alternative program. For example, include 2 elders, 3 parents, 3 dropouts, 1 school site administrator, 2 teachers.
3. Examine aspects like schedule, structures of learning, curriculum, programming, extra curricular and co-curricular events, community inclusion, and human capacity in community to contribute.
4. Develop a plan and timeline to move forward with action.

This process from this point will be different for each community as each community has its own needs and resources. For guidance I suggest villages look at what others have done broadly, both in the Lower 48 and in Alaska as well as in indigenous schools and non-indigenous schools. A well-networked preexisting website like the Alaska Native Knowledge Network (ANKN) would be an ideal site to collect and comment on summaries of lessons learned, perhaps prepared as an area for future research. Communities could then innovate their own processes, seeking district guidance possibly for facilitation, partner via an AFN workshop or statewide professional development that brings teachers together to learn and share, or possibly have a forum where village schools or personnel might share successes, learnings, or obstacles and how each were addressed along the way. A clearinghouse website could possibly be hosted by the new NSBSD website, the State, or even the University of Alaska Fairbanks. A move to alternative-type-programming requires buy-in across the board for it to work that will necessitate that teachers,

students, and ideally community members are included in the development process as well as the feedback related to what is implemented. Ultimately, this is an example of how alternative school methods can indigenize the curriculum via an Indigenous lens- pedagogy, learning and dynamic and engaged leadership. True self-determination in education for Indigenous peoples is very much context-dependent, as it should be, and highly reliant on who and how a variety of stakeholders across scales are engaged in the process of envisioning a new model for educational equity and student success.

It must also be seriously considered that we may not need an alternative school mode but rather a working current school model that better serves its student population and has less staff turnover? In other words what if the problems currently facing schools are less about doing things "alternatively" and more about improving current strategies to better address student needs?

4.9. Conclusion: Implications of Alternative School Programming for NSBSD

Different sets of actors in remote, rural school districts favor alternative schooling practices that will enable their young people to gain the western education of compulsory schooling but also provide time and space to practice Indigenous knowledge and livelihoods tied to living in these areas and their ancestors; "place-based learning.". Utqiaġvik has the critical mass in number of students and available capacity to engage an actual alternative school, whereas the villages will need to look towards moving their delivery model towards an alternative school type program. This will allow for a more equitable educational mix of Iñupiaq and Western methods to increase flexibility and therefore future resilience.

The aspects of successful alternative schooling covered in this chapter are vital aspects for any high-quality school that successfully addresses the needs of a wide variety of students, no matter what the model. The feasibility study I discuss may have been scoped from a multitude of other perspectives: the village needs…a charter school, a community school, a vocational-education school, an expeditionary learning academy, a choice. The villages are too small in size to accommodate a choice or to truly expect another school or a full-blown "alternative" to what they have now. What needs to be done is a bridging of the chasm between community and school in the case of, daresay, all village schools, all rural, urban, community schools. The disconnect between the community in which a school exists and the school itself is counter-productive and detrimental to student outcomes and success. While in this chapter I identify all the possible causes, certainly we must return to a discussion of self-determination. Generally I would place some responsibility in the standards-centered reform effort. In trying to standardize. we have replaced Indigenous determination in relation to education with colonial-legacy government decision-making. But my study and this paper are not primarily about standards but about the community's contribution to school and the school's contribution to the community. This relationship can be easier to navigate if clear tenets of self-determination are developed between governments and their citizens rather than retaining the patchwork general understanding of the value of fate control without clear guidance in education about who gets to control what. Whether handcuffed by state/federal/district mandates for curricula and assessments, the bridge crossing the chasm must be built and crossed, as has been done before in Arctic Alaska. One only need look as far back as the dismantling of Project Chariot in (NAB) or the great Duck-In (NSB) to find cases when the public or governmental sector was made to understand where the community insisted on being able to determine their own activities and future. The same energy

can be applied within the school system or building. Over the course of the fieldwork there was a demonstrated sense of parallel forces rather than forces working against each other. Ultimately, both want a successful, fulfilled, happy, graduating student body, even if the definitions of success ultimately vary.

So how might this collaboration be accomplished? Alternative school programming is certainly a rich idea with many useful contributions to the conversation. But could it be just another reform flavor of the month? A panacea or gopher-hole we are likely to chase down and see no real substantial improvement for students? The divide between Indigenous community and Indigenous school has a history that must be acknowledged, addressed, and present in order to move forward. I offer this chapter on crisis from Collaborative Resilience (Dukes, Williams, & Kelban, 2012) as a place to begin addressing some of these wounds and to overcome the chasm that currently exists between community and school. Two major problems to be overcome that have been reiterated in almost every presentation about the North Slope Borough School District has been 1) staff transiency and 2) the relative lack of community and parent involvement in schools. The process of building or developing collaborative resilience could offer beneficial outcomes to address these powerful levers within the NSBSD education system affecting the quality of education in village schools. The process will be difficult, messy, emotional, and potentially healing. It may require additional training. It will require the right personnel. It could be that this is not a process in which the district would like to engage. It might take someone who would be willing to stick with it for ten years or more to see it through, possibly a difficult find for the NSBSD. So we either find the right personnel or figure out a way to make it sustainable without all of the same personnel. I would venture to say alternative school programming, as a stand-alone, will not "fix" the issue of engagement in schools.

Collaborative resilience will take visionary leadership and a district willingness to innovate and accept the potential for mistakes along the way. Once again the NSBSD could reclaim its propensity and capacity to lead educational change, one school/community at a time, one student at a time with its unhindered view from the top of the world, hunter on sea ice ridge assessing the situation, getting a lay of the sea ice.

Chapter 5 Education, Arctic Alaska, and Youth Engagement: What do Arctic Residents Think? What can Researching Youth Tell us about the Future and Why?

5.1 Introduction

In September 2013, the Northern Alaska Scenarios Project (NASP) began. This was a multi-year project funded by the National Science Foundation (NSF) engage Northern Alaska communities in three scenarios development workshops over the span of a year in order to facilitate scenarios development workshops leading to communities of practices that consider sustainability and community health and well-being. In this project I was a major contributor to the grant proposal as well as serving as the education consultant. Forty-nine resident experts from across the North Slope Borough (NSB) and Northwest Arctic Borough (NWAB) participated across the three participatory scenarios development workshops. From this project in thinking about possible futures, I sought to better understand how and what Northern Alaska residents viewed the education processes that they themselves had experienced as well as the children of their communities were currently experiencing. My hypotheses were as follows: Please note I retain the original language of the hypotheses below for accuracy as discussed in the methods table in Chapter One. The terms "formal" and "informal" in H5 have dissolved and been replaced in my research by other terms far more appropriate to the role of different types of education. This distinction, my participants have taught me, is not one made by Arctic Alaska resident experts and has negative connotations in terms of settler-colonial expectations and valuation of learning.

- H5: Education will be viewed as a composite of both formal "in-classroom" time as well as informal "cultural learning" by participants, not as an either-or proposition.

- H6: Both forms of education will be considered highly relevant factors to healthy sustainable communities (resilient communities).
- H7: The final list of key factors of healthy sustainable (resilient) communities will have both direct and indirect references to social learning.

This chapter reports on data from those workshops ranging from group products like key factors briefs and scenario narratives to individual products, survey response and participant contributions. The goal of the workshops was to gather community opinion leaders together, who normally might not problem-solve together, to answer a key question that became the focal question of the scenarios development workshops. What is needed for healthy, sustainable communities in Northern Alaska by 2040? Education would have to contribute to this important question somehow. For the NASProject healthy and sustainable were a proxy for resilience, hence its connection to community resilience. The results indicate that for these participants education is highly valued, but that it needs to be diversified in approach, methods, and outcomes.

5.2 Youth and Futures

A more detailed discussion of youth studies will preface Chapter 6, here I explain why it is important to consider youth within the pool of expert local participants in the Northern Alaska Scenarios Project (NASP). Working with youth at the cusp of entering adulthood affords the opportunity to better understand the real costs and benefits of governance, economic systems, and public school outcomes and how they produce equitable or inequitable opportunities. Representing the perspectives of youth and their wealth and breadth of knowledge to be gained

through systematic research carried out across boroughs or communities of Alaska to improve public schooling and policy.

> It is important to study youth, because the points where young people engage with the institutions that either promote social justice or entrench social division are significant points of reference for every society. Hence the study of youth is important as an indicator of the real 'costs' and 'benefits' of the political and economic systems of each society. (Wyn & White, 1997, p. 6)

In this charge, the Northwest Arctic Borough (NWAB) is on the precipice of innovative research and work with its youth populations. The young people in a society are vital contributors in the schools in each community, and are integral to the community's present and future resilience. Research indicates that schools, particularly rural ones, promote community resilience, as do young people who succeed at crossing boundaries of culture and expectation (Bohensky & Maru, 2011; Kawagley & Barnhardt, R., 1998). Engaging them in research projects, especially as collaborators and more so as planners, allows them to cross multiple such boundaries in the process of bolstering resilience. This research focuses on the role of compulsory education in Northern Alaska and its relationship to the development of resilient youth, who are a vital part of creating sustainable healthy communities in the region. In particular, I focus on how thinking rigorously about the future can create "cognitive space," or what scenarios scholar Wack (1985) called "disciplined imagination," which young people can use to imagine possibilities and relate them to their current situations (Kupers & Wilkinson, 2014, pp. 76-77). Explicitly setting goals and writing them down as a learning intervention (and easily incorporated into scenarios workshops) also improves learning outcomes across genders and ethnicities (Schippers, Scheepers, & Peterson, 2015), and could potentially be applied in rural Indigenous communities

as well. Because the young inherit both the progress and problems of those who come before, I argue this is a particularly important exercise that enables them to connect their learning in compulsory education to other learning processes (e.g. Indigenous Knowledge, vocational training) and engages them more fully in their own educational development. In addition, thinking about the future promotes "backwards design," the ability for youth/students to plot out their paths towards a significant goal (Wiggins & McTighe, 2007; Isecke, 2010; Schippers et al., 2015).

The marginalization of Indigenous people by state and national authorities, even in locations where they are a local majority in Alaska, is not a new story. However, in the North Slope Borough (NSB) and Northwest Arctic Borough (NWAB), the Alaska Native population is a large majority and Alaska Natives occupy a majority of public offices. While a full review of the impacts of Indigenous-dominated decision-making at this scale is beyond the scope of this work, it is important to note that these two boroughs have taken and made significant strides in areas of self-determination, within governing structures currently available to them. But while one's Indigenous identity may not, at this scale, be a source of marginalization, other personal attributes such as wealth, cognitive and physical abilities, location (village or hub) may be. Age can also be a source of marginalization, I focus on this in relation to the role of schools as agents of resilience. In the past, youth in these communities were rarely asked to participate in important scientific work or social science surveys. However, this has begun to change in the last decades, in particular with young people being able to learn alongside scientists in the field (e.g., LEO and ALISON). The Local Environmental Observer (LEO) Network in Alaska is a salient example of the impact youth involvement is having on research. Their annual Youth Environmental Summits demonstrate the dual-purpose (learning while contributing) utility of

involving youth in research (Britt & Richards, 2016). Also, the Alaska Lake Ice and Snow Observatory Network (ALISON) engaged youth across Alaska measuring and sampling snow that evolved into a research, outreach and education opportunity for both students and scientists (Morris & Jeffries, 2008).

The resilience of youth both as individuals and as a factor of community resilience has not been well-served by public education offerings structured around uniform national and state mandates. Public school systems are in a state of transition until the control evolving at national and state levels shifts towards local input of determination. This offers the potential for change, through careful planning, for positive change and transformation in the system. The standards movement might function as a foundation for timely, consistent and in-depth analysis, so that missteps could be quickly corrected and successes widely shared. This is an opportune time to build capacity, and to make decisions based on sound information, consensus, fairness, transparency and accountability so that these become the norm of future community governance processes. Local governance may not always lead to the best-case scenario, but implementing models of co-management designed with input by well-trained advocates creates a real possibility of producing self-governed, dual-education Indigenous youth. There is already some movement in the school systems towards considering the local context and the kind of interdisciplinarity that strategies like scenarios development offers. The North Slope Borough School District is planning curricula utilizing Wiggins and McTighe's (2011) Backwards Design method in order to incorporate the Iñupiaq Learning Framework (ILF) and Alaska's state standards. While the ILF is in the early stages of implementation, teachers are currently working and collaborating to develop lessons and modules. It is too early to assess whether ILF has led to measurable gains in student achievement, and in any event the standardized testing data has been

too inconsistent for fruitful comparisons. However, early signs show that concerted efforts by district and school leaders and lead teachers are having a positive impact on shifting curricula towards integrating both local Iñupiaq inputs and Alaska content standards (Cope & Hirshberg, 2015) - although, after five years, the units engaging ILF and the state standards "were not in broad use" (Cope & Hirshberg, 2015, p. 19). Without consistent data and leadership to support and assess efforts to reform and improve school systems, it becomes almost impossible to evaluate success. Backwards design methods and scenarios development methodologies similarly venture from a future point back to the present and could both be usefully incorporated into curricula, i.e. the working backward from a future point, 2040.

5.3 Resilience in Northern Alaska

My research focuses primarily on public education systems in two boroughs in Alaska - the North Slope Borough and the Northwest Arctic Borough. My dissertation draws upon several key veins of literature. In this section of the dissertation, I complement studies of resilience, and of the subtopic of the impact of learning and education in manifesting resilience, by discussing the resilience of individuals in educational environments. Secondly, I discuss futures thinking and the creation of scenarios methods that can involve deliberative local participatory processes.

It is important to compare and contrast the factors needed for resilience with the protective factors that schooling can provide for individual academic resilience, and how this might lead to greater resilience after graduation and within the community.

> Fostering resilience in children is a long-term project involving systemic change within the communities of children. It isn't something we do to kids. It isn't a curriculum we

> teach to kids. It isn't something added to a school or community with short-term grant money. (Krovetz, 2007, p. 10)

The changes necessary to foster resilience in youth are longitudinal concerns, not knee-jerk or expedient reforms or approaches. They must address not the individual student but the educational environment, the adults involved, and the communities of students. It is not a curriculum. If it is not all of these things, then how can these research findings inform us? These findings about individual resilience demonstrate the vital importance of resilience at the community level. The links between community and individual resilience in the literature are currently murky at best. This work points to the potential of scenarios development and long-term planning with students and their families, teachers and school staff. Krovetz (2007) identifies three key protective factors necessary to foster and support student learning and resilience across the family, school and community: 1) a caring environment - adults knowing and caring about the well-being of children; 2) positive expectations - appropriate and explicit goals with support to achieve them; 3) active participation, engagement, and accountability practiced by students in meaningful learning activities. These three items are similar to the three recurring elements of successful alternative schools, as derived from the literature: 1) a deeper connections between school staff and students; 2) flexibility in work and schedules; and 3) applicability to the student's lives, connections to the real world, authentic assessments, and an emphasis on projects and on problem solving. Alternative school methods have been designed and fine-tuned for students from underserved environments to develop resilience. How might this then ripple out into family and the community in positive or useful ways? This informs my work as I try to understand the connectivity of the individual resilience of school children, and the communities in which they are taught, as possible nodes of empowered community

resilience. The research community has not closely examined how community and individual resilience are linked, and this work reviews what is known and what I have found to approach this gap. I would further argue that when we discuss individual protective factors, we begin to see a similarity between resilience across individual, community, and cultural scales. The concept of self-determination and its relationship to protective factors and resilience is covered in chapter 4.

5.4 Scenarios Thinking

To examine the gap between individual and community resilience, we have to look at a field of study that examines futures. The scenarios process has been a tool of business for several decades (Kupers & Wilkinson, 2014; Lindgren & Bandhold, 2009; Chermack, 2011). When futures thinking and scenarios development are facilitated intentionally and with the best data on hand, participants gain the capacity to think ahead in rapidly changing competitive environments and make crucial decisions even in the absence of complete information about the future (Kupers & Wilkinson, 2014; Lindgren & Bandhold, 2009; Chermack, 2011). One can see the relevance of scenarios thinking to my subject matter. Arctic Alaska boroughs must make educational decisions about futures in a period of great uncertainty and raplex change. How they make decisions matters. What they aim for in their futures matters. Also significant is how participation in the scenarios development process fundamentally changes the way individuals and organizations think about the future (Wollenberg, Edmunds, & Buck, 2000; Lebel et al., 2006; Bohensky et al., 2011).

Currently, there is a growing need for democratic tools that enable actors at local-government scales to address pressing concerns in the midst of uncertainty about future

conditions and potential adaptation needs. This is particularly true of areas experiencing rapidly changing environments (e.g., drought, floods, diminishing sea ice, erosion) in conjunction with unfamiliar and complex social-environmental issues (e.g., remote locations, resource extraction, cultural revitalization). Two literature streams have recently grappled with such problems, but with little overlap. Resilience theory (Chapin, Kofinas, & Folke, 2009) and deliberative democracy (Smith, 2003; Munton, 2003; Bäckstrand, Khan, Kronsell, & Lövbrand, 2010) both promote governance by informed actors in an effort to produce decisions that avoid social-environmental collapse. The former focuses on resilient ecosystems, the latter on participatory problem solving. They intersect in the normative streams of their scholarship when proposing that multiple actors can and should be involved in decision-making that incorporates multiple perspectives of the system in question (e.g., Indigenous Knowledge, the perspectives of the marginalized).

Why scenarios? Different stakeholders in the two boroughs have taken significant strides to address concerns of physical health, well-being, youth engagement, cultural pathways, and education. Across both, healthy communities and self-reliance have been set as goals. As state, national, and international pressures on decision-makers in the Arctic increase, scenarios enable communities to manage risk 1) by anticipating changes, 2) by bringing people together so no one group is "doing it alone," and 3) by figuring out where organizations are succeeding or where changes are needed. Scenario exercises produce neither forecasts of what is to come nor visions of what participants would like to happen. Rather, they produce pertinent and accurate information related to questions of "what would happen if…" and thus present the possibility of strategic decision-making to reduce risk. Scenarios can combine the best attributes of a

participatory democratic process with the need to make decisions about adaptation in order to develop policies that prioritize resilience.

The Second World War was a catalyst for bringing scientists out of disciplinary silos to confront the problems facing multiple nations in conflict. Military scenarios were the beginning of concerted efforts to think into the future. Herman Kahn is thought of as the father of scenarios, founded the Hudson Institute in the mid 1960's, and brought scenarios out to the public. He told stories of "unthinkable futures" to engage a populace, mainly various scenarios and possible outcomes of global nuclear conflict. As advances in technology tantalized a generation, society began to consider what a future without limitations bounding the capacity of human innovation might be like. As societies stabilized politically, they began to turn to futures planning to consider alternative futures. In 1968, the Stanford Research Institute (SRI), hired by the U.S. Office of Education, considered two focal questions about futures:

1. Would society be good at controlling its destiny?
2. Would society be flexible, open and tolerant or would it be authoritarian, violent and efficient? (Ringland & Young, 2007; p. 209)

The outcomes of these early scenarios development processes gained little traction with the Office of Education or the political leaders of the time, so their application as a strategic planning tool was minimal. SRI continued to facilitate the scenarios process for the Environmental Protection Agency, and subsequently corporate planners seized on the process as a tool to gauge consumer trends. The Hudson Institute brought scenarios development processes to corporations, in particular Shell Oil. These scenarios were a different approach than Shell's usual economic modeling forecasts based on running numbers from current, past and expected

trends. Shell's capacity to weather the oil shocks of the 1970's buoyed interest in the scenarios development process.

Through the 1980's, interest in scenarios waxed and waned. Some major American corporate players turned to scenarios as they saw their market shares dwindle in the face of new competitive threats. By 1990 there was another resurgence in interest in scenario development based around the need for strategic planning in the face of rapid change, reorganization and unreliability of the status quo. More recently scenarios have increasingly been used by the public sector (e.g. nonprofits, NGOs, and government). The use of scenarios has changed with the times and now incorporate management, planning, strategy testing, action research, and conduits for communication within organizations. Two Bain researchers reported in 2007 that the firm's regular survey of management tools showed "an abrupt and sustained surge" in the use of scenario planning after September 11, 2001 (Rigby & Bilodeau, 2007). Bain's most recent survey showed that 65% of companies expected to use scenario planning in 2011 (Wilkinson & Kupers, 2013, p. 120).

> At a deeper level, futures thinking can create capacity. It is not so much predicting correctly or getting the right strategy, that is, using the right tools, but about enhancing our confidence to create futures that we desire. Futures methods thus decolonize the world we think we may want – they challenge our basic concepts. They deconstruct. (Inayatullah, 2008, p. 6)

Engaging in scenarios processes changes the way we think about the future (Wollenberg, Edmunds, & Buck, 2000; Lebel et al., 2006; Bohensky et al., 2011) by providing a structured approach to consider "what if?" Rather than some unascertainable blob, the future becomes a suite of possibilities that a community or individual works towards through concerted efforts to

address needs, possible perturbations, and outcomes. An individual, community, organization, or institution cannot be certain that any singular future will come to pass, but they can be certain that one of a suite of futures is possible. Through this multi-pronged approach to possible futures, we can consider a broader swath of potential adaptations that are useful across a wide scope of potential scenario outcomes. This makes scenarios development exercises particularly useful to communities experiencing uncertainty and rapid change. Scenarios development workshops offer communities a low-risk yet high-yield method to enable social learning on a local scale. Envisioning a future 20-30 years away frees participants of the manacles of immediacy and the responsibilities of work, position, or community involvement. It broadens horizons to ponder a suite of possibilities not always considered when managing for the here and now. It enables participants to transcend "survival mode" to explicitly, deliberatively and collectively consider outcomes and pathways. These exercises require that the best and most current information and data is gathered and shared through the scenarios development process, resulting in robust choices.

5.5 Scenarios Development as Social Learning

Consequently, scenarios development can promote governance by informed actors representing multiple sectors within the community who act as free and equal knowledge holders. They gather to consider both local conditions and the data and observations that inform them about these conditions. Workshop facilitators gather the best research to share and collaborate with workshop participants. Scenarios development exercises have the power to be integral to community decision-making. Through the course of a workshop, both in small groups and across the whole group of 30-40 people, individuals are involved in a variety of deliberative

actions through which they have the opportunity to become more acutely aware of the community's agenda or will.

Lebel et al. demonstrate that successful social learning is made up of groups who interact in positive ways akin to deliberative democratic practices. They are likely to produce new knowledge, shared understanding of this knowledge, enhanced trust, and ultimately, collective actions (Lebel, Grothmann, & Siebenhüner, 2010, p. 334). Such a process has largely been untried in regions of the Arctic where decisions must be made under conditions of uncertainty and often among groups who may not fully trust one another or the knowledges presented (e.g., conflicts over oil and gas and Indigenous livelihoods, disagreements over Indigenous language education and national school standards). Lebel et al. (2010, pp. 335-336) outline six ways that social learning processes are potentially important for building adaptive capacity at individual and community scales amongst participants in social learning activities:

1. Social learning can help cope with informational uncertainty
2. Social learning can reduce normative uncertainty
3. Social learning helps to build consensus on criteria for monitoring and evaluation, (which are the essential elements of adaptive management and governance schemes often used to build adaptiveness.)
4. Social learning processes empower stakeholders to influence adaptation and take appropriate actions themselves by sharing knowledge and responsibility in participatory processes.
5. Social learning can reduce conflicts and identify synergies between adaptation activities of various stakeholders, thus improving overall chances of success.

6. By addressing the concerns of all relevant stakeholders, social learning improves the likely fairness of decisions and actions. Deliberative processes bring together alternative perspectives and forms of knowledge reducing the likelihood that collective responses are based solely on relative influence and power of the actors involved (Pahl-Wostl & Hare, 2004).

These were similar to the observed outcomes of the scenarios processes we have employed or facilitated with Northern Alaska communities of both adults and high school students. Furthermore, "Social learning—which it should be underlined—is only one of several objectives of public participation exercises. Others include improving the quality, legitimacy and accountability of decisions" (Huitema et al., 2009; Mostert et al., 2007; Rowe & Frewer, 2000); (as cited in Lebel et al., 2010, p. 348). I argue that scenarios development exercises are examples of social learning. If a wide array of decision-makers and leaders are brought to the table, and the process is transparent and includes ample representation of stakeholder interests, scenarios development workshops can and will produce useful findings for adaptation and policy implementation. This is true at the youth level as well, because including youth in building these capacities leads to improved quality, legitimacy, and accountability, and has far-reaching consequences for the governance work they undertake when they inherit the reins.

> Nowhere were the differences between the resilient individuals and their peers more apparent than in the goals they had set for themselves. Career and job success was the highest priority on the agenda of the resilient men and women, but the lowest priority for their peers with problems in adolescence. (Werner & Smith, 1992); (as cited in Krovetz, 2007, p. 9)

Social learning allows communities to address the uncertainties inherent in planning for the future, such as informational and normative uncertainty (Lebel et al., 2010). Scenarios development exercises produce decisions that can help avoid social-environmental collapse. Social collapse can be avoided by working together towards a general consensus based on the best data, imagining and narrative building at hand. Typically when scenarios development exercises are used for strategic planning, the decisions made cover a multitude of possible perturbations to the system and strategic adaptations or mitigations are based on broad outcomes. Rather than on-the-spot or spotty adaptation, which has been the case in rural Alaska communities, scenarios exercises generate long-term strategies and ongoing work towards a future resilient community alongside day-to-day mitigation strategies.

The main resilience concepts of adaptation and transformation are key in envisioning future states, and also integral to the strategic planning that occurs after scenarios development concludes. Understanding resilience and resilience thinking facilitates an understanding of the trajectory of change. Systems thinking is at the core of both resilience and scenarios thinking as both grapple, similar to many Indigenous Knowledge systems themselves, with the complexity of multidimensional systems in a holistic manner. Finally, resilience thinking and scenarios thinking both account for uncertainty through the use of knowledge and its application to the future state. "Having access to learning spaces where existing assumptions can be questioned and alternative pathways tested and reflected upon makes today's realities and future uncertainties less terrifying" (Tschakert & Dietrich, 2010, p. 15).

Scenarios development can clearly be applied to address social-ecological resilience because in considering the future, we consider more than just current human-nature interactions. Rather than immediate concerns and day-to-day evaluation of ecosystem issues, participants

must take the long view to understand how we progress from our current point to the future 20 years out. Local actors typically need better data organization and processing techniques than what is typically available through any single organization. "Practically, we can measure variables such as evolving awareness of climate and other changes, the willingness and ability to engage with unknown yet conceivable risks, and channels for information exchange through methods such as individual and community learning baselines and network mapping" (Tschakert & Dietrich, 2010, p. 15). Further complicating matters in the fact that often the data within one organization is so specific and siloed that using it to make any kind of comprehensive or long-term decision or planning is futile due to refusal to consider alternative or additional data sets.

Scenarios exercises enable cognitive space for participants to come to terms with the inherent uncertainties that Lebel et al. (2010) write about, informational, normative and relational—all elements of the social learning process. "Mind space," an alternative term borrowed from meditation and enlightenment practices, might best capture the essence of what is created when a person is free to imagine thirty years ahead. "Scenario building provides an ideal space for exploring options, uncertainties, limitations, and trade-offs. Rather than imposing climate change as a "foreign" element into one single scenario building exercise, we believe that fruitful learning outcomes stem from iterative experiences and cycles of reflection" (Tschakert & Dietrich, 2010, p. 14). Scenarios development exercises liberate participants because they depart from what is currently known and use knowledge and imagination to build a path to many futures 20-30 years out. This cognitive or mind space is important for facilitating or producing innovation, creativity, diversification of current strategies, and space for social learning. This space in turn allows participants to better understand and develop protective factors and resilience at many levels or scales. The mind space is critical for young learners who often have

that space restricted by tight standards and confined to classroom contexts, which seem arbitrary and disconnected from daily life.

> Qualitative scenarios have been shown to offer a useful method for engaging stakeholders in anticipatory adaptation planning in a way that translates climate change trends to the local scale and makes them relevant to local people. They have been used in a range of settings, with demonstrated utility in improving adaptive co-management of natural resources, stimulating social learning (Gidley, Fien, Smith, Thomsen, & Smith, 2009; Wollenberg et al., 2000) and incorporating different epistemologies (Bennett & Zurek, 2006). To date, however, their use with Indigenous communities and the explicit incorporation of Indigenous knowledge has been limited. (Wesche & Armitage, 2014, p. 1097)

5.6 The Northern Alaska Scenarios Project

While my results from NASP are only a slice of the project's outcomes it is worth briefly contextualizing what NASP was and how it was articulated to the participants and others. The Millennium Ecosystem Assessment, MEA (2005) defined human well-being as having several components: 1) security; 2) basic material for good life; 3) health; and 4) good social relations. These four components support the fifth: freedom of choice and action, meaning "opportunity to be able to achieve what an individual values doing and being" (MEA, 2005, vi). The MEA also defines four categories of "ecosystem services" – provisioning, regulating, cultural, and supporting – that directly or indirectly provide humans with goods or social needs. However, we can't assume that ecosystem services alone create human well-being and the

"opportunity to be able to achieve what an individual values doing and being." Freedom and choice must also play a role (Figure 13).

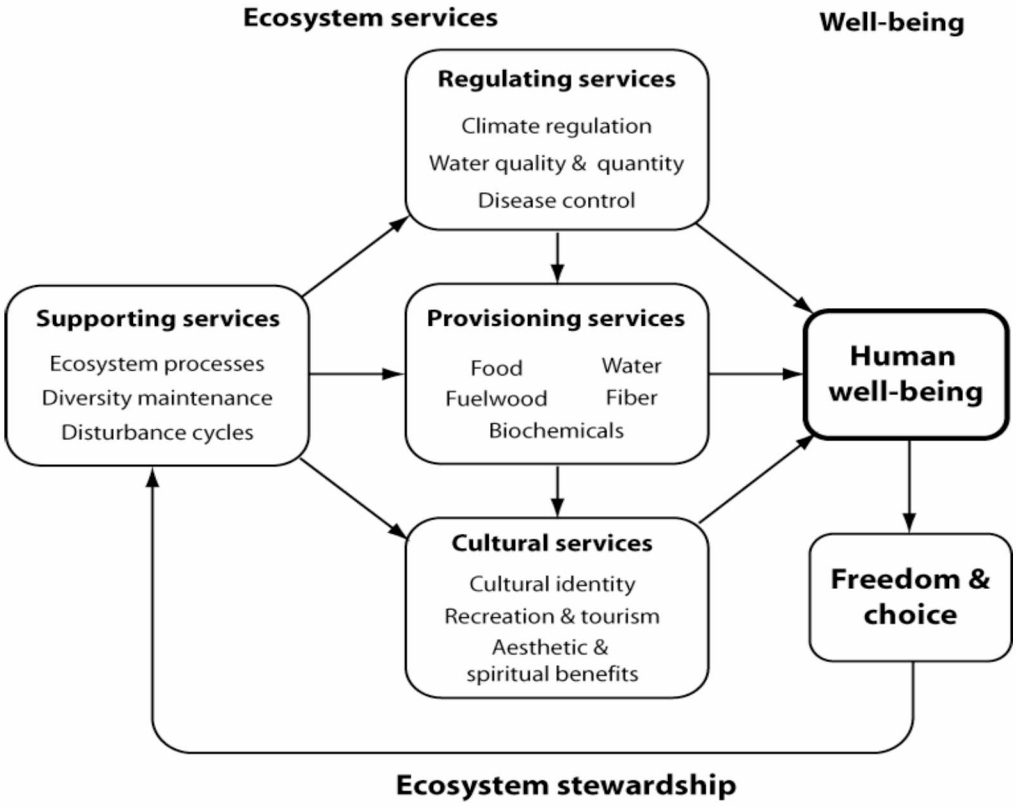

Figure 13: Components and linkages related to human well-being. From the Millennium Ecosystem Assessment, 2005.

We wanted to ask arctic residents about their own perceptions of the good life – what would they choose as the key components of healthy sustainable communities in the future. In other words, what drivers can make their communities resilient, or not and how can we track these vital pieces? If our shared goal is to ensure that people and communities are able to choose how to adapt to change, this requires a deliberative democratic processes as detailed above.

The Northern Alaska Scenarios Project, NASP, was a three-year project funded by the National Science Foundation (NSF). Its purpose was to create an opportunity for resident experts in the Northwest Arctic and North Slope Boroughs (Alaska, USA) to fully address the question, **"What is needed for healthy sustainable communities by 2040?"** The goals of the project were: (1) to identify key factors of resilience as understood by resident experts of Arctic Alaska; (2) to jointly examine multiple potential futures for each key factor, as well as linkages among them; and (3) to create and share detailed scenarios of multiple plausible futures for Arctic communities. The importance of engaging arctic resident experts was written directly into the grant that funded the project. Indeed, the National Science Foundation funding allowed the project to fund the costs of anyone who was a resident of arctic Alaska to participate, including a small honorarium. The project also focused on engaging the broadest possible range of participants. The core team recruited participants by taking part in meetings such as those of the Inupiat Community of the North Slope (ICAS), talking to individuals directly, making personal phone calls, sending formal email invitations, and – perhaps most importantly – engaging in "snowball sampling". This means that participants were asked to recruit other potentially active and engaged participants from among their communities, colleagues, and acquaintances. Finding participants in this way allowed the core team to build a research group within a population in which they did not initially know all the key individuals. We solicited any regional residents with deep familiarity of the key elements of community health or sustainability across the projects seven identified systems of the region: health (inclusive of biological and mental), biophysical (environmental), economic, education, communication, socio-political, and justice. Our NSF funding allowed us to pay anyone who was a resident of arctic Alaska to participate. Thus, there was no exclusion of any potential participant based on costs.

As stated above, the focal question for the project was "What is required for healthy sustainable communities in arctic Alaska by 2040?" To address this questions, NASP created a *participatory explorative scenario process* consisting of four stages: (1) gathering of information relevant for the problem at hand, (2) evaluation and synthesis of this information to develop raw scenarios, (3) review and revision to develop final scenarios, and (4) use of scenarios to develop monitoring indicators for social and environmental systems that matter to those people living in the Arctic. Before we could hold the first workshop, we had two major tasks: connecting and communicating with participants to assure the best possible input and engagement, and information-gathering to provide the best possible background information. We spent about a year researching all the information we might need to make this project a success. This included gathering information on many of the topics described above, including resilience, participatory democracy, scenarios planning, and communities of practice. We wanted to learn from the successes and failures of other researchers and other local participants engaged in similar projects around the world. I was the person in charge of leading the development and analysis of the educational sector.

NASP used a series of three workshops in Utqiaġvik (formerly Barrow; WS1), Kotzebue (WS2), and Anchorage (WS3) during 2015–2016 to bring experts from both boroughs together to share creative strategies for the next few decades so that those living in Arctic Alaska can shape their futures. In sum, as noted in Chapter One, we had 49 respondents participate in the survey process. Of this total we have 48 participant affiliations reported.

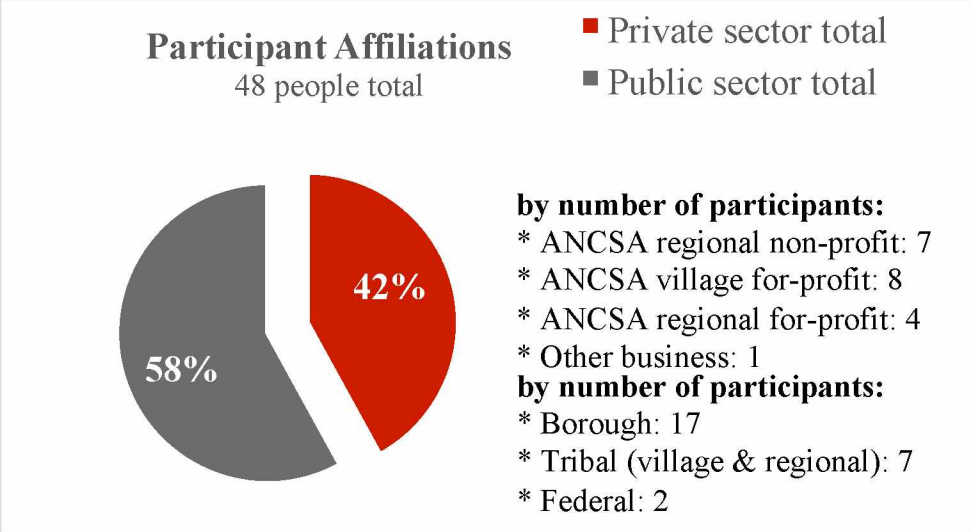

Figure 14 NASP Participant Affiliations

In addition we asked the participants to identify their top three areas of expertise across the six systems.

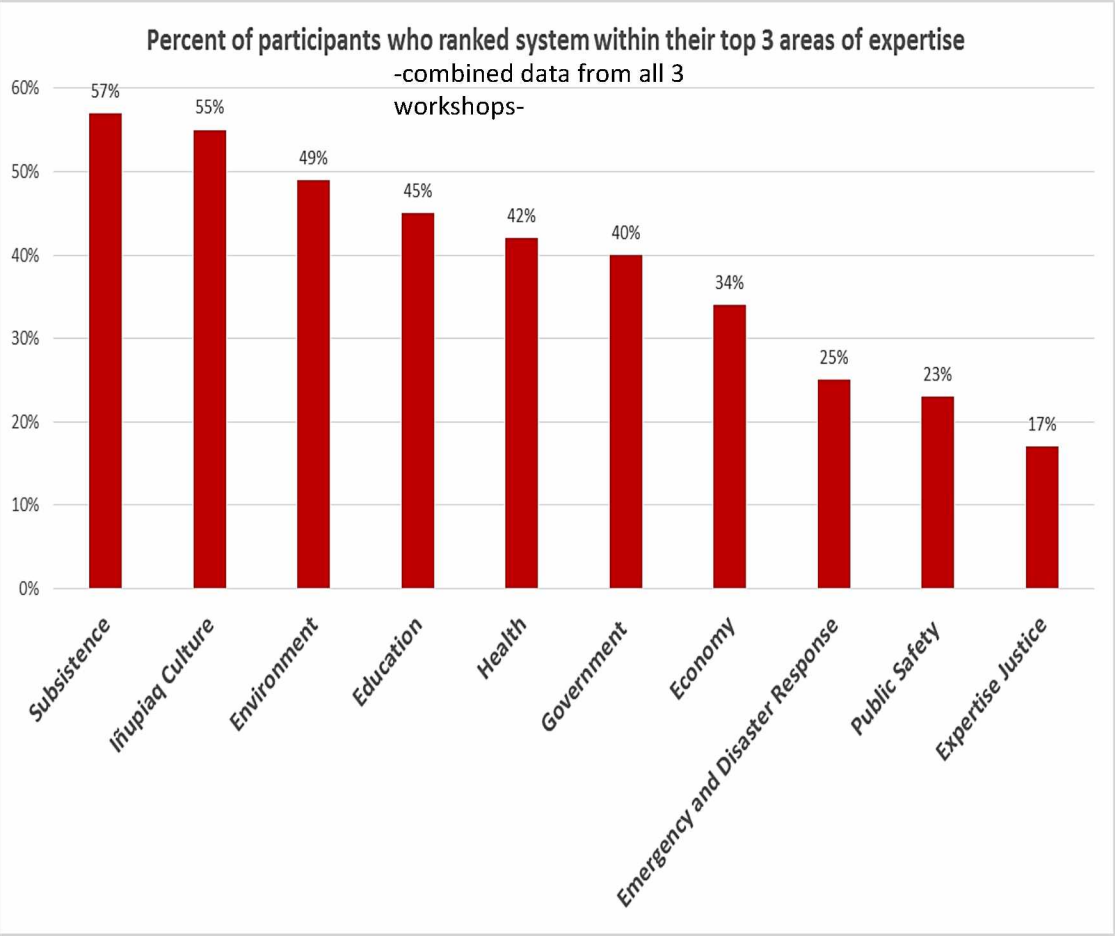

Figure 15 Percentage of Participants Who Ranked System within their Top 3 Areas of Expertise

The Arctic residents who comprised the workshop attendees completed anonymous pre- and post- surveys. For the first two workshops, WS1 and WS2, I posed ten closed Likert scale questions assessing the importance of various aspects of education in rural Alaska. The last question was on open-ended query concerning the participants' thoughts about the role of formal education in the future. These surveys are located in Appendix X. The survey was 19 questions in length and included both closed and open-ended questions, ranging from Likert scale queries to evaluations to open-ended questions eliciting more in-depth responses. The surveys proved useful in that they removed any bias that may have occurred by having a researcher ask questions

and observe and record responses. The survey method enabled analysis of trends and served to test my clarified research questions and hypotheses (Creswell, 2012, p. 376). These survey questions and graphed survey data are located in Appendix 17 on page 355.

The analysis below is generated from four pre – and post-workshop survey questions assessing attitudes about the impacts of education and futures thinking in Northern Alaska. These surveys were given out at each workshop, although we designed differing surveys for the few people who attended more than one workshop. We had 33 participants in Utqiaġvik with 29 completed surveys, 25 participants in Kotzebue with 24 surveys, and 18 participants in Anchorage with all 18 surveyed. In sum, there were 30 one-time participants, 17 two-time participants, and 4 three-time participants. A 5-point Likert scale was used for questions Q1-Q10, where 5 is very important, 4 is somewhat important, 3 is neutral, 2 is somewhat unimportant, and 1 is unimportant. Q11 was a short answer question.

(Question Group 1- Likert)

Q1: How important is formal education (K-12 and beyond) to the future *you are pursuing?*

Q2: How do you view the importance of formal (K-12 and beyond) education *for the future of the region?*

Q3: How important is traditional knowledge education, learning skills outside of schools at home or on the land or water, to the future *you are pursuing*?\

Q4: How important is *thinking into the future*, 10 or 20 years from now, to your current work?

(Question Group 2- Likert)

Q5: How important do you think traditional knowledge education will be in affecting the region's future?

Q6: How important do you think K-12 schooling will be in affecting the region's future?

Q7: How important do you think some college education will be in affecting the region's future?

Q8: How important do you think vocational training will be in affecting the region's future?

Q9: How important do you think a college degree will be in affecting the region's future?

Q10: How important do you think a graduate degree will be in affecting the region's future?

(Question Group 3- short answer)

Q11: When you think about the future, 15 or 25 years from now, what role do you see formal education (K-12 and beyond) playing in that future?

And alternatively: Q12: Thoughts or feelings from own experience with scenarios concerning NWABSD Scenarios Project around focal question, "what do communities in Northern Alaska need to have a sustainable subsistence lifestyle in 2040?"

5.7 NASP Results

5.7.1 Scenarios Workshop #1- Utqiaġvik Pre-workshop Survey

Attendees perceived formal education as very important for the future at both individual and regional scales. Education in Indigenous Knowledge or traditional knowledge, and learning skills outside of school - at home or on the land and/or water - is very important to the future respondents are pursuing. While 20 of 29 respondents perceive that thinking into the future is very important to their current work, 6 are neutral and 3 perceive it as somewhat important. 26 respondents perceive traditional knowledge as very important to the region's future. 27 respondents perceive K-12 schooling as very important to the region's future. Higher levels of education (vocational, some college, college degree, and graduate degree) with means of 4.5, 4.4, 4.4, and 4.3, respectively were perceived as very important to the region's future, although

perceptions of importance tail off as years of formal schooling increase. This indicates that while formal schooling is of value, there seems to be a perceived ceiling of value in pursuing degrees.

Q19: When you think about the future, 15 or 25 years from now, what role do you see formal education (K-12 and beyond) playing in that future?

1. (5 respondents mentioned) - Education is extremely important, a key factor of life, and holds a major position.
2. (4 respondents) Education needs an emphasis on traditional knowledge, culture, values, and lessons from ancestors as well as balance.
3. (4 respondents) Education enables self-determination and opportunities for local people to pursue education completion and higher education, and then benefit from being hired in skilled and professional roles in the local economy.
4. (3 respondents) Education is key to the creation of future leaders, providing Natives with a greater voice, and improving decision-making.
5. (3 respondents) Education has come a long way and will continue to evolve and play a vital role in creating healthy sustainable communities through teaching children health, sustainability, success, community and workforce readiness.
6. (3 respondents) Curricula must integrate and reflect the needs of the community and families and the values of staying in community. Students need to know their options and feel that the community supports those options.
7. (3 respondents) Education needs to improve or be haunted by its shortcomings;, needs to move towards college preparation; and lastly needs to prepare 60% of the Indigenous workforce with degrees. These are important in order to contribute to local research and adaptations.

5.7.2 Scenarios Workshop #1- Utqiaġvik Post-workshop Survey

There was negligible, if any, change between pre- and post- survey results except for 3 fewer respondents for the latter. A majority of respondents perceive formal education and knowledge gained outside of school as very important. An interesting difference was the change in people's perceptions of post-secondary education's importance in the region. After the workshop respondents' perceptions shifted towards vocational training, the options of 'some college,' 'college degree,' and 'graduate degree' all had slightly greater importance than in the pre-workshop survey results. Something in the workshop changed the group's attitudes toward these four types of post-secondary education ever so slightly in their favor.

Q11 When you think about the future, 15 or 25 years from now, what role do you see formal education (K-12 and beyond) playing in that future?

1. (6 respondents mentioned) Education will be very/more important in the future.
2. (5 respondents) Education enables local people to provide input, comprehend plans, adapt to negative impacts and plan for a sustainable future.
3. (4 respondents) Education provides a local technical, professional, and skilled workforce.
4. (4 respondents) Education should support/build/teach Iñupiaq knowledge, language and values.
5. (3 respondents) Education builds the capacity for trans-knowledge leadership, especially among youth.
6. (2 respondents) Higher education is necessary to have a global impact via communication skills.

5.7.3 Scenarios Workshop #2 Kotzebue Pre-workshop Survey

Half the number of Utqiaġvik workshop respondents participated in the pre- survey for Kotzebue. There was a greater percentage of participants in Kotzebue who perceived the importance of formal education as very important when comparing it to the Barrow results. Only 11 respondents of 15 answered how important thinking about the future was to their current work, but of those, 9 responded that it is very important and 2 that it is somewhat important. Traditional knowledge or Indigenous Knowledge was perceived as important equally across the two participant groups, Kotzebue and Barrow. In the Kotzebue workshop, vocational training and some college were perceived as slightly more impactful to the region's future, whereas a college or graduate degree were perceived as slightly less important. Overall, even though there were only half as many respondents, the results were remarkably similar for the pre surveys except where noted above.

Q11: When you think about the future, 15 or 25 years from now, what role do you see formal education (K-12 and beyond) playing in that future?

Returning Participants: 9; 7/9 answered Q11

1. (5 respondents) Education will have a big role, be essential, very important, a priority, a key factor

2. (5 respondents) Education will be important for self-determination, i.e. local ownership of processes, a place at the table for decision making for the future, and a greater role in co-management & land use planning.

3. (3 respondents) Education will be important in developing leadership among local people and youth.

4. (3 respondents) Education will continue to be key in integration across knowledges.

5. (2 respondents) Education will incorporate Native traditions and culture as well as the issues of the Arctic, health and safety, and job skills.

6. (2 respondents) Education will produce more regional 2-year colleges and technical institutes and the labor force to support development.

Other responses: (*New Participants…15, 13/15 responded to Q11)*

In service to community

Not much hope, not going in a good direction

Through school

More skilled & self- reliant communities x2

Preparing local people for success, well paid jobs, leadership roles

More place-based education, local consultants

Broader definition of success for the future

Critical in establishing positive life skills in our youth

Improving finance skills, language skills English & Iñupiaq, and hope and drive

Need larger local role in educating youth to reinforce education and values

Affect workforce and who participates in the WF

Preparing students to enter vocational technical training or college

Prosperity

Diverse mix of educational backgrounds in community

Will suffer without well-educated

Must be valued

5.7.4 Scenarios Workshop #2 Kotzebue Post-workshop Survey

For the Kotzebue post-workshop survey, deviations from the means are much greater because of the smaller number of respondents; this as a result of a change in the short-answer education survey questions about the NWABSD High School Scenarios Project for returning participants. However, consistent with the other survey, participants said formal education from K-12 onward is very important to their futures: 7 of 9 called it very important, and 2 of 9 somewhat important for the future of the region. Results were more split on the perception of the importance of traditional knowledge education to the future one is pursuing: 5 of 9 considered it very important and 4 of 9 somewhat important. Thinking into the future was still perceived as very important for participants' current work: 7 of 8 deemed it very important, 1 of 8 somewhat important. Kotzebue (WS2) respondents perceived this as slightly more important than Barrow respondents. Kotzebue (WS2) respondents found the importance of traditional knowledge education to the region's future to be slightly less than those of the Utqiaġvik (WS1) respondents. K-12 schooling was perceived as very important across all four survey groups, with a total of 72 responses rating it as very important and only 7 rating it as somewhat important. Graduate degrees scored the lowest mean of all the questions.

Q11 When you think about the future, 15 or 25 years from now, what role do you see formal education (K-12 and beyond) playing in that future? (For Post-workshop Surveys, new participants= 10)

Education will be:

-Pathway to self-determination

-Place-based education, leadership, mgmt. training (people, projects)

-Effectiveness and healthy climates of schools are big part of future in every way

-Important but only to quantify TK

-Education must show how it is relevant to flexibly responding to an uncertain future. People do not see how important.

-Education needs improvement, to instill traditional values and how they translate to modern life, to educate in English to prepare for higher education, and to stop being just a place to hangout.

-Produce local cohort to understand, participate, engage at local and international stage

-Critical to moving forward with sufficient capacity to manage our own future

-Planning for and developing student skills for success in what they want to pursue in life. --May include vocational, technical training or college.

For Post-Workshop returning participants, 3 out of 8 responded to Q12

Q12: Thoughts or feelings from own experience with scenarios concerning NWABSD Scenarios Project around focal question, "what do communities in Northern Alaska need to have a sustainable subsistence lifestyle in 2040?"

-Outstanding opportunity for HS students (note: due to survey mix-up, new participants answered questions for returning ones- see above)

-Good to get youth to start thinking about the future- the future of their environments, people, traditions, land, animals, etc., future careers, what they want to do, hopefully to be leaders in their communities. Hope for NS students too.

-Traditional knowledge should always be taught to and forced upon youth. Teaching our values is important. I've learned from my grandparents. Parents need to teach what they were taught.

-Students see the difficulty leadership have in the discussions at the dinner table more than other areas. The hope for students will be increased if they participate. Concerns for future may create social ill reactions must have staff for this. Preparations to help identify concerns and reactions to educate F/U evaluate hopelessness???

5.8 Evidence of the Scenarios Process Framing Thinking around Education in Northern Alaska

The two documents below are key factor and future projections briefs created as part of the data briefing book about Northern Alaska. In sum, these 21 documents document the process and important outcomes of the three two-day scenarios workshops. The first document was created based on cursory knowledge from my internship in the NSBSD and internet research into Northern Alaska's educational systems. This document became a centerpiece of deliberations and negotiations among NASP participants in Workshop 2 when we groundtruthed the key factor write-ups about the meaning and purpose of education and its role in supporting community resilience. It demonstrates how community visions for education can be developed collaboratively and productively via deliberative social learning, the form of a scenarios development workshop.

Key Factor Page (draft 1): Higher Education Access Locally

Definition

The accessibility opportunities for career advancement or post-secondary learning in pursuit of a degree in Northern Alaska communities, hub and otherwise.

Future Projections

1. Arctic Permafrost League:

Local options like Iḷisaġvik and Chukchi develop into small universities offering 4-year degrees in many locally necessary career fields, especially Arctic studies related. The universities also offer a wealth of global courses through programs like the University of the Arctic. All of Northern Alaska is united via high bandwidth Internet. Each of the higher education hubs end up specializing and through digital connectivity become each other's partners in offering local access to meaningful higher education opportunities. Alongside this there also develops one of the newest university rivalries, the famous Ilisagvik vs. Chukchi basketball games.

2. Old school:

Northern Alaska colleges continue to offer the same type of programming that they offer today. Enrollment continues to steady but opportunities do not expand and many students must leave their communities to seek access to higher education opportunities. Internet bandwidth still remains elusive.

3. No school:

Both colleges close. Enrollment drops with neither college meeting the demands of local industry nor student needs. Students must seek higher education outside of their communities. Internet bandwidth remains elusive.

4. University of Broadband:

Both colleges develop into facilitators of access to higher educations. Each college is a hub of enormous bandwidth. Students come to attend classes in small classrooms hooked up digitally. Technological support, educational advisement, and local educational experts on Iñupiat culture become primary employees of the new universities.

5. Home school universities:

Both colleges close down. Large bandwidth access is universal and affordable. Students develop their own personalized learning plans. Out of the colleges demise sprout a new industry of educational advisement that is done on a local or digitally delivered basis. Higher education is more accessible but because of its lack of face-to-face time, students do not engage and system works for select few.

Additional Discussion

It is possible to start one's academic endeavors in one of the two hub cities, Barrow or Kotzebue, in Northern Alaska. It is not possible to earn a four-year degree at either of these institutions. To do that a student must move to Anchorage, Fairbanks, Juneau, or outside Alaska. Distance education via 4-year institutions like the University of Alaska Fairbanks are potentially on the cusp of being viable as Internet capabilities and bandwidth are slowly increasing but not yet able

to offer full functionality for distance education in the hub cities. Distance education cannot even be considered in the non-hub communities.

Barrow-

Iḷisaġvik College - "Iḷisaġvik offers higher education opportunities for Barrow and the North Slope village residents. The common goal for all educational programs, especially at high school and college levels, is to prepare students to participate in the job market, tailoring many programs to meet the needs of employers of the North Slope" (Iḷisaġvik College *About Us*, para. 1). The "College offers post-secondary academic, vocational and technical education designed to align with the borough and Alaska's workforce needs" (Iḷisaġvik College *About Us*, para. 1).

An Initiative in Barrow

Barrow's Residential Learning Center is a *proposed* boarding school to entrain employees most likely in oil and gas production. "The facility would provide an opportunity for village students to receive short term intensified educational experiences utilizing Barrow resources at the high school and potentially Iḷisaġvik College. There is an estimated need for 50 students." (Bezek, et al., 2015, p. 151)

Kotzebue-

UAF Chukchi campus offers general education requirements and a few associate degrees. UAF Chukchi campus offers key benefits in terms of outreach to make higher education more accessible across the NWAB. There is a NANA Resource Tech Specialist in every village. These local personnel as resources support village students in their pursuit and access of higher education opportunities.

Alaska Technical Center in Kotzebue-

> Although ATC is a small school, it is a highly effective training center. ATC continues to provide core training programs, employer-designed short courses and Adult Basic Education/GED. Programs available at the Alaska Technical Center include Business Technology, Construction Trades Technology, Health Occupations, Process Technology, and Culinary Arts. Short courses are offered based on customer or employer demand. The student population includes residents from all sectors of Alaska and of all age groups. A majority of our students are from rural communities throughout Alaska. (NWABSD, *Alaska Technical Center*)

UAF eLearning- Other distance education or other correspondence or distance learning programs Non-hub communities have only digital access to higher education opportunities. This option is nonexistent to very limited access to these type of learning opportunities because the Internet bandwidth serving these communities is low and unable to handle videoconferencing and/or many of the other required digital tasks that online learning involves.

Key Factor: Higher Education Access Locally compiled by Douglas Cost, dscost@alaska.edu.

Key Factor Page (draft 2): Local Access to Education for College, Career, and Livelihood Readiness

Definition

Education that is locally accessible should be available that will prepare people to enter college, vocational and skill based programs, and to learn livelihoods. These can come from different post- secondary learning institutions for academic degrees and vocational skill sets, but also include situations such as one-on-one learning (mentorship), and socio-cultural activities (e.g. sewing, sled- making) that prepare people for independent livelihoods. This process begins during K-12 school years and continues through post-secondary learning institutions and options.

Future Projections

1. **Arctic Knowledge League (AKL):**

Local options like Iḷisaġvik College and Chukchi Campus develop into small universities offering 4-year degrees in many locally necessary career fields, especially Arctic studies related. The two universities offer a variance of courses from traditional Iñupiaq skills, workforce skills in demand in the region, and 4-year degree course offerings. The universities also offer a wealth of global courses through programs like the University of the Arctic. All of Northern Alaska is united via high bandwidth Internet. Each of the higher education hubs ends up specializing and through digital connectivity, they become partners in offering local access to meaningful higher and continuing education opportunities. Students are attracted from within the community and internationally. Education in Northern Alaska becomes an important driver

of regional economics. Alaska Natives revisit and develop new pedagogical methods that incorporate the old ways of teaching and anticipate the new through concerted efforts in Northern Alaska. Alongside this there also develops one of the newest university rivalries, the famous Iḷisaġvik vs. Chukchi basketball games and Pan-Arctic Alaska Sno-Go Challenge.

2. **Workforce Colleges:**

Northern Alaska colleges continue to offer the same type of programming that they offer today. Administrators do their best to address pressing workforce needs through new class offerings. Enrollment continues to steady but opportunities are piecemeal to impact immediate job training needs. Nevertheless, many students must still leave their communities to seek access to higher education opportunities. Both colleges continue to offer accelerated dual-credit learning opportunities for high school students. Non- accelerated high school students arrive completely unprepared as curriculum collaboration and advisement between public school system and colleges remains undeveloped. Traditional Iñupiaq skills development occurs informally in the community. Subsistence skills are still highly valued but other skills dwindle in importance and die out over time. Internet bandwidth still remains elusive, which limits the capacity for a full suite of distance learning opportunities.

3. **Universities of Alaska, No-thanks**

All colleges and universities shutter their doors. State of Alaska deletes all funding of universities in the year 2025 over the course of the next 5 years. Students must finish their degrees by 2030. On-the job training or training in Indigenous skills happen informally in communities. Populations dwindle. Villages decline and hollow out. Most congregations of populations are only around what resources can be extracted from Alaska's lands. The vibrancy of Alaska's Indigenous cultures and languages fades into a distant horizon by the year 2040.

4. **Arctic Minerva:**

Both colleges develop into facilitators of access to higher educations and job training. Each college is a hub of enormous bandwidth. Students come to attend classes in small classrooms hooked up digitally. Technological support, educational advisement, career planning and local educational experts on Iñupiaq culture/skills/language become primary employees of the new universities. Distance learning is the wave of the futures. University networks become more fully developed and reciprocity between universities enables university credits to flow like knowledge currency.

5. **At-home higher learning:**

Both colleges close down. Enrollment drops with neither college meeting the demands of local industry nor student needs. Students must seek higher education outside of their communities. Large bandwidth access is universal and affordable. Students develop their own personalized learning plans. Out of the colleges' demise sprout a new industry of educational advisement that is done on a local or digitally delivered basis. Higher education access is more accessible but because of its lack of face-to-face time, students do not engage and system works for select few. Traditional Iñupiaq skills experience revival across Northern Alaska communities as students seek out ways to reconnect.

Additional Discussion

It is possible to start one's academic endeavors in one of the two hub cities, Barrow or Kotzebue, in Northern Alaska. It is not possible to earn a four-year degree at either of these institutions. To do that a student must move to Anchorage, Fairbanks, Juneau, or outside Alaska. Distance education via 4-year institutions like the University of Alaska Fairbanks are

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Key Factor: Local Access to Education for College, Career, and Livelihood Readiness compiled by Douglas Cost, dscost@alaska.edu.

5.9 Conclusion

The hypotheses discussed in the introduction to this chapter hinged upon resident experts across the various sectors of the two boroughs viewing many forms of education and social learning as highly relevant of resilient communities, or healthy and sustainable communities. Education was frequently discussed both in terms of a formal compulsory process but also as an Indigenous process tied to language learning, learning cultural values, and learning skills tied to subsistence, travel, and safety. Both were viewed as needed for success in this region which is a mixed subsistence economy with greater job opportunities in the hub cities (Utqiaġvik, Kotzebue) than in remote locations. The final key factors produced by participants that make up resilient communities rely on a wide range of social learning both tied to schools and to a culture whose Indigenous knowledge does not separate the "social" and "environmental" as two separate systems. As demonstrated in the key factor brief above, "Key Factor: Local Access to Education for College, Career, and Livelihood Readiness," participants view a variety of community and public schooling inputs as contributing vitally to individual success and community resilience and livelihoods. While the final list of key factors at large contained some indirect references to social learning, through the process participants both realized and agreed that the decision-making processes facilitated via social learning produced fair and equitable outcomes through deliberation and compromise.

It is important to note that, in a project and survey not designed around education but around the general issue of the future of the Arctic Slope, respondents singled out K-12 schooling as very important to the region's future. The real question is how? Will it affect the region or individual students negatively or positively, and how can it best be shaped to positively affect the region's future? Further education lends itself to leadership, to new voices in decision-

making, and enhanced trans-knowledge navigation for the future. Thinking about how to inform and guide the education system's influence seems pivotal in thinking about futures. In terms of the importance of various forms of post-secondary education to the region's future, respondents saw vocational training as slightly more important for the region, followed by "some college," "college degree," and "graduate degree," respectively. So it seems that respondents felt the keys to the region's future lay not in graduate education, but rather in job training and some college or initial college degrees. Education has the potential to inform and affect the future and contribute to healthy sustainable communities, but it is unclear if it is currently accomplishing that, or how it might better achieve it in the future. The short-answer responses above suggest some ways to work toward this goal. If we think about these statements as answers to a subquestion such as, "What is needed for/from education to facilitate healthy sustainable communities?" the responses below indicate a clear desire to combine Indigenous and Western education modes:

> *-balance of knowledges, amp up the Iñupiaq input language, traditions, traditional knowledge, culture, local and amp up the academic rigor of English writing and reading*
>
> *-skills training*

I believe a local focus and a concentration on job skills can be combined into making education more relevant to its geographic context. These responses point to a perceived divide between community and school. More so than many other factors, it will be important to bridge this gap; Students spend too much time in schools for them not to contribute to community health and sustainability. School will continue to be viewed as having little merit until the fabrics of education and community are interwoven into a blanket from which we toss students into the world.

Chapter 6 Scenarios Development Workshops with Alaska's Arctic Youth: Ways forward in Thinking about Northwest Arctic Borough Communities' Resilience

6.1 Introduction

Based on the identified local needs of three communities in the North Slope Borough (chapter 4 on alternative schools) and regional-scale results of the Northern Alaska Scenarios Project (NASP) identifying education as a key factor for Arctic Alaska (chapter 5- NASP), I designed a social learning pilot project for high school students in the Northwest Arctic Borough (NWAB). I wondered how students would engage the concept of futures thinking. In what ways did they know their own social-ecological system? As individuals, what would be their understanding of their own personal resilience? Of their community's resilience? These thoughts became the key questions leading to the three hypotheses of this chapter. The overarching question I seek to address here is, how do high school students in Arctic Alaska understand the future and their own resilience? My hypotheses were as follows:

- H11: Students would be more imaginative than their adult counterparts in their contemplation of the future.
- H12: Based on their lived experiences, their key factors would differ significantly from the adults' key factors in NASP.
- H13: Students would have varying sources of resilience in their lives but common themes would emerge based on culture and location.

This chapter reports on an exploratory project engaging Arctic youth in futures thinking, called Arctic Futures Makers (AFM). At a scenarios development workshop held on February 23 and 24, 2016, high school students from every village in the Northwest Arctic Borough

participated in thinking about futures to promote "backwards design," the ability for youth to plot out their paths towards a significant goal. The results indicate students share similar ideas in terms of the key drivers of future resilience, when compared to adults who participated in separate scenarios workshops. However, AFM also revealed limitations of exploring deep uncertainty with high school students, especially in the U.S. where standards-based testing has downplayed innovative thinking in public school curricula.

6.1.1 Approaches to Youth Studies

The literature review that follows contextualizes my hypotheses and explains why, for both NASP and my research in general, I consider "youth" as an important category for research, but also as a vital component of community resilience in Arctic Alaska. Australian Peter Kelly has been writing about youth and youth studies for over a decade, and is worth quoting at length to express my orientation towards "youth studies."

> As an artefact of expertise, youth is principally about becoming: becoming an adult, becoming a citizen, becoming independent, becoming autonomous, becoming mature and becoming responsible. There is some sense in which all constructions of youth defer to this narrative of becoming, of transition. Moreover, there is a sense in which becoming automatically invokes the future. Youth, as it is constructed in at-risk discourses, is at risk of jeopardising, through present behaviours and dispositions, desired futures. This sort of probabilistic thinking attempts to construct a series of causal relationships between these different configurations of time and space. These possible futures, as additional artefacts of the activities of expertise, are fundamentally normative. There is a strong sense that there are preferred futures awaiting these populations in transition. (Kelly, 2011, p. 49)

Kelly's work highlights three key aspects of my research. First, I view youth as a category, a unit of analysis worthy of study due to their collective, age- and experience-based attribute of "becoming." Second, youth have a long future in front of them that they may or may not think about, and that they may or may not have strong feelings about in relation to outcomes. Third, youth experience government and governance (See chapter 2) differently than adults because both their state and cultural schooling are informed by societal demands expressed through techniques of governance (e.g. classroom seating, number of hours in school, subjects taught, perspectives encouraged and discouraged).

What are youth studies? And why, as Kelly notes above, are youth an "artifact," a "class," to be studied at all? There is debate over this even among youth studies scholars, who frequently cite three main aspects of high school and college-age young people that make them unique topics of study. First, the *transitional approach*, as noted by Kelly (2000, 2003, 2011), Evans and Furlong (1997), Henderson, Holland, McGrellis, Sharpe, & Thomson (2007), and Furlong (2012), is tied to the "invention" of adulthood by people who are not yet at that stage. Society anticipates that children and young adults will transition into adulthood, creating pathways for themselves based on schooling, economic, societal, and cultural choices. One reason to study such a group is to understand how young people make these choices, and what facilitates positive (adaptive) choices compared to negative (maladaptive) ones. This is an important aspect of the lives of young people in the rural Arctic.

Indigenous youth in these regions (and also non-Indigenous youth to an extent) often have two, sometimes competing, transitional forces pressing on them: the "white," "Western," "capitalist" mode and the "Indigenous," "rural/Native," "subsistence" mode. In the NAB this also relates to language and place-based identity. This matters because as the region undergoes

complex and rapid changes, so too does its youth, simply by virtue of being young. But, because of their strong ties to landscape change in terms of food provision or livelihood, the transition of these NAB youth into adulthood may strongly impact the fate of both their culture and community in their hands. Will they go away for college? Will they return? Will they learn the Iñupiaq language and skills? Will they pass these along to their children? In villages of fewer than 1,000 people, the future leadership of today's high school students can have a profound impact. In my research with them I wanted to understand how imaginative they were in relation to their possible futures, to know the scope of their thinking about trajectories for the NWAB that may be adaptive or maladaptive (H11). In addition I wanted to understand how they viewed the attributes resilient communities from a group perspective, and whether there was a generation gap between them and the adults (H12).

Both hypotheses relate to the second major thread of youth studies, the *cultural approach*. Through this approach, authors define youth as a class because young people share cultural similarities with one another based on age. Initially focused on how young people have been resisters of trends or events in society (Hall & Jefferson, 1976), this concept has expanded over the years to broadly discuss what youth *do*: leisure activities, subcultures, lifestyle choices, consumption patterns and deviance have all become subjects of study to scholars seeking to delineate a "youth identity" (Furlong, 2012; Abbot-Chapman & Robertson, 2009; Waiton, 2001; Miles, 2000; Best, 2009). This informs my last research sub-question as well: what do the high school students in NWAB have in common in their youth culture, and how might it promote or detract from their resilience? The 21 participants in my study were all Indigenous. This is a benefit in terms of being able to explore similarities and differences in young people who share a similar culture-within-a-culture identity. It could also be considered a drawback because I had no

"white" or other ethnicities as a control. Hypothesis 13 is significant for reasons already noted above, and in addition, if we can ask young Indigenous arctic residents what promotes their ability to cope and excel in life, such research can feed into a variety of programs or awareness efforts for young people. We know schools are tied to community resilience, chapter 2, but schools are filled with youth, and this chapter makes the case that their thoughts, feelings and capacity to consider their own futures constitute individual resilience (discussed in chapter 4 and 5) that also supports their communities.

In addition to these established approaches, I also offer a relatively new perspective on youth that asks what they might have to offer in terms of policy. I simply call this the *policy approach,* and make note of it because AFM indirectly addresses it and I may engage it in future research. Note that Arctic Futures Makers was a pilot project designed to determine if exploring participatory scenarios with youth had value for them, but also whether it could apply to the future of policy in the region as a social learning exercise. The promise of Arctic youth to actively shape the future remains an untapped resource in the pursuit of community resilience. Lebel and others (2010) have outlined six ways that social learning processes, such as scenarios development, are potentially important for building adaptive capacity. My research is based on the concept that engaging and empowering young people in thinking, deliberating, and planning for futures develops a foundation for effective community leadership later in their lives. This third line of youth studies argues that "when youth are engaged, particularly when empowerment and development opportunities are provided, there are multiple benefits for society" (Maconachie, 2014; Powers & Tiffany, 2006; Ho, Clarke, & Dougherty, 2015, p. 52). Powers and Tiffany (2006) also note that asking youth to generate knowledge related to important aspects of adult decision-making broadens their skill sets. In one of the very few

published articles about youth and future society, Novaky and Varnagy (2013) describe results from a project called "Hungary 2025" in which surveys were administered to 980 18-year-olds through a representative sample of secondary schools in Hungary. While their results are not wholly comparable to a small workshop setting, some of the trends they noted apply to observed AFM trends. Four similarities were: 1) technocratic optimism that people will innovate their way out of current problems to improve their life; 2) a focus beyond the self to one's community and consideration of disadvantaged groups; 3) not imagining the future to be that much different from the present ("avoiding extremities" even when faced by questions about global warming); and 4) a degree of fear (Novaky & Varnagy, 2013, p. S53).

Lastly, one cannot engage in youth studies, in particular studies of youth who are marginalized due to age, gender, sexual orientation, race, or ethnicity, without looking at the reverse of what is discussed above: what do policy and governance *do* to young people? In other words, mistrust of youth that can become institutionalized in forms of surveillance and suspicion (Kelly, 2003), and for Indigenous youth this mistrust can become the norm in "contemporary settler colonial institutions, discourses, and policies" (Dhillon, 2017, xi). Kelly (2005, p. 1) argues that the anxiety adults face in relation to young people is hardly new, and that young people are considered to occupy a zone "as imagined within the institutional spaces characteristic of modernity" where "certain young people have been viewed as being 'ungovernable' and lacking in 'self-regulation.'" These representations have always been fundamentally shaped by race, class and gender and situated in relation to particular ideas about "'normal' youth." Dhillon (2017) makes the case in her book *Prairie Rising*, focused on Indigenous youth in urban Saskatchewan, that Canada's programmatic focus on an "Indigenous Youth Crisis" engages state and community actors to create a disabling narrative. Although the focus purports inclusion and

participation by Indigenous youth, it does not account for the complexity of the governing institutions that press on their lives. Dhillon's ethnographic study examines how social control over the minds and bodies of Indigenous youth combined through intertwined systems of education, child welfare, and criminal justice create a devastating deficit approach to governing these young people. She takes a the view that the "politics of recognition" accorded Indigenous people in Canada actually limits self-determination by reflecting settler colonial concepts of who and what is recognized (also reflected in Coulthard, 2014, p. 3). Additionally, the politics of inclusion that result from recognition create a push by established national and regional governments for Indigenous peoples to participate "in the development of programs and policies affecting their communities."

> But, participation does not exist in a neutral, suspended space, empty of power and history, nor are its benefits necessarily axiomatic or its implications readily predictable…participation, as an instantiation of contemporary inclusionary governance, is fundamentally a reassertion of asymmetrical power relations, albeit in a new guise, because the terms and form of political engagement are mediated by a settler-nation-state that has been created through colonial dominance. (Dhillon, 2017, p. 14)

No population is perhaps more vulnerable to this than youth:

> Governance impacts Indigenous youth acutely, and holistically, immediately and in the long term, for theirs is a future still in the making, a future that will be marked by ongoing settler self-articulation and the concomitant realities of an Indigenous resurgence that takes many shapes across many spaces. (Dhillon, 2017, p. 9)

As noted in my methods section in chapter 1, I have wrestled with trying to provide a social learning process for young people in the NWAB without limiting Indigenous youth to colonial settler expectations of their future. My goal for Arctic Futures Makers has been to find a way to encourage high school students to imagine, fantasize, evaluate, consider, and deliberate as many possible futures as they consider fruitful, including the destruction of current forms of governing to be replaced by Indigenous governing systems. I strongly argue that social learning cannot limit the imagination or reduce concepts like self-determination to fantasy. Participatory scenarios, as noted in Chapter 5, are "what if" exercises inclusive of all forms of knowledge and thinking even if they are unpalatable to some members of the group, but stopping short of proposed violence or conclusions based on false information.

> The concept of future-maker is invoked in order to redirect the focus away from the dominant change and cultural loss discourses over towards the question of how humans, groups and communities navigate in and create meaningful lifeworlds of socially informed choices and possibilities...Future-making points our attention in that direction. Such a view does not rule out asymmetries of power and does not rule out the limitations and forces of context and structure but is actually a recognition of the primacy of place, people's creativity and how it is used to produce translocal or, better still, transplace alliances and cooperative formations. (Sejersen, 2015)

These ideas were important in framing my thinking about this work, and I was inspired by Frank's research and theory-building to hold the scenarios development workshop with NWAB high school students. These two ideas were key to moving the conversation towards liberation and equity in fate control for Alaska's Arctic youth.

6.2 Northwest Arctic Borough Youth and Scenarios Development

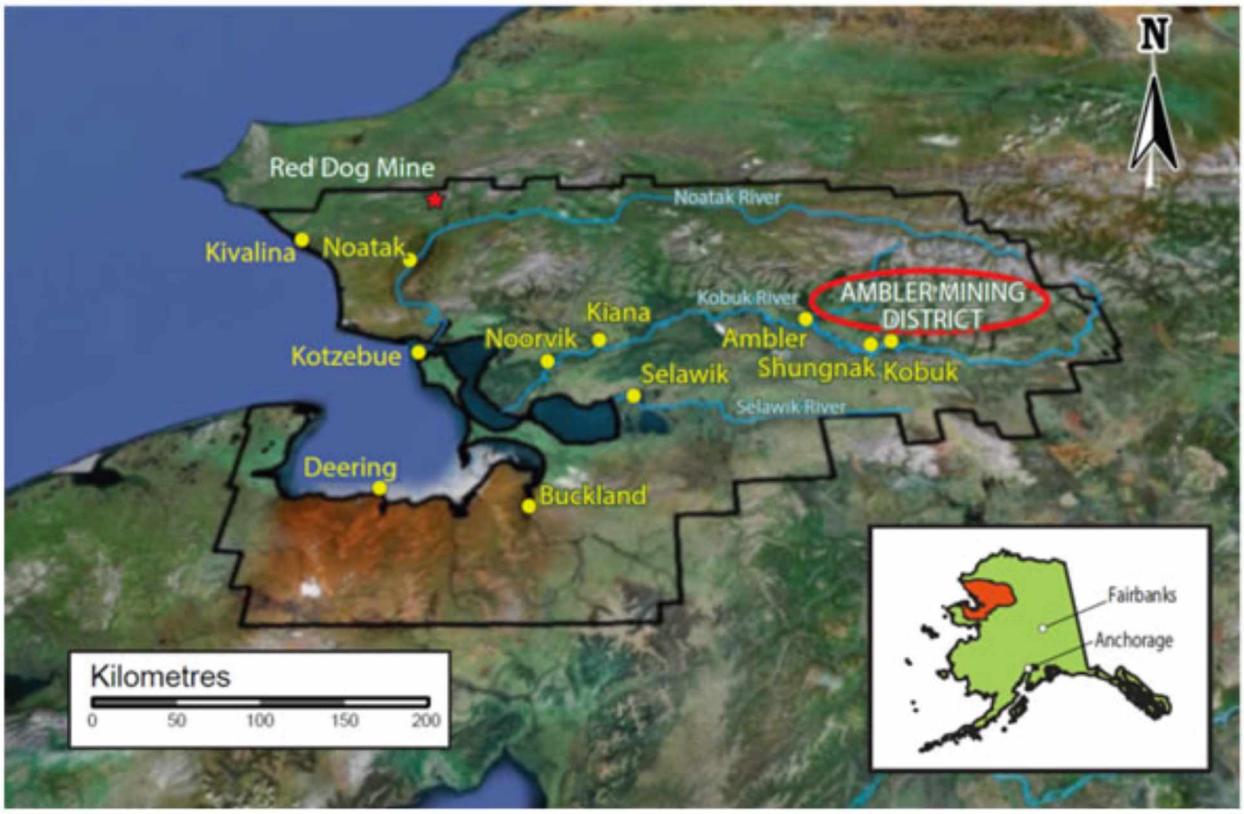


Figure 16 Map of Northwest Arctic Borough

From https://www.sec.gov/Archives/edgar/data/1543418/000106299314000408/form10k.htm

The youth are future policy makers and frequent users of ecosystems and social services. Because youth are in the initial phases of seeking, testing, and proving their own self-regulation, they can also begin to explore ways to diversify their own resilience portfolios. Youth are initiating their journey toward developing human adaptations to living successfully. This period of youth development is a prime time for exploration, experimentation, and making mistakes with a multitude of resources for resilience and it is the adults' and/or decision-makers' responsibilities to provide the youth of the community with these opportunities.

> By listening carefully to what marginalized people have to say – with fairness, honesty, and detachment – and trying to understand their life worlds are crucial first steps in gaining less partial and distorted accounts of the entire social order…Starting thought

> from marginal lives is not intended to provide an interpretation of those lives but instead a causal, critical account of the regularities of the natural and social worlds and their underlying causal tendencies" (Harding, 1992, p. 583).

Youth have the potential to be learning depositories and the greatest resources for a community's resilience. Blackwell, Trzesniewski, Dweck (2007) and others have found that children reshape their brains while learning and practicing skills, which in turn motivates them to achieve once this learning and practice are made explicit and reflective.

Just as the elders contribute important knowledge and lessons from the past, if youth are to arrive in the future with any information or skills at all, the key is to include them in decisions early and often. Their capacity to innovate and imagine is significant. Let the elders and stateswomen bring the discipline, let the youth bring their imaginations, and betwixt them the resilient future can unfold. Lacking the strictures of job title or community position, youth in the community have increased freedom to think outside the box. Through my experiences as a middle school, high school, and university teacher, I have found that students can often generate novel ideas and approaches that stretch the boundaries of social learning and open up the imagination and conversation of a group. Mistakes are part of growing up, and hence allow students to venture guesses and make attempts that provide the necessary ingredients to develop a richer narrative of the pathway to an identified future. This narrative in turn leads to a more robust set of adaptation strategies to be considered along the way.

Youths under 18 compose 36% of the NWAB's total population. They hold the potential to develop adaptive capacity, social learning and deliberation from their transitional point into the social system, which holds promise for future adaptation and resilience. See the U.S. Census chart below for comparison.

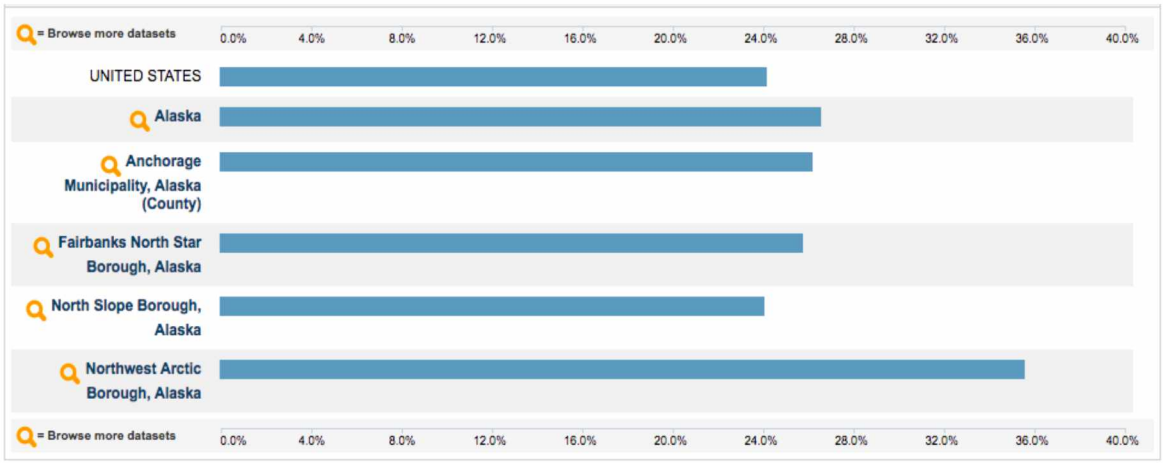


Figure 17 Youth Population Percentages of Total Various Scales, April 1, 2010

Engaging youth in a scenarios workshop engages them in their future. A scenario development exercise is not planning or decision-making. It is a process of asking "what if?" that enables the participants to establish what matters most for the future and to manage risks. It forms a solid foundation for understanding uncertainties that can directly inform planning and decision-making in the future. Instead of passively adapting to whatever comes, scenarios can assist individuals and organizations to actively and creatively shape the future of the NWAB. Because young people will inherit our problems and progress, we wished to present an opportunity for them to display what they have learned and to develop a sense of determination over their future in Arctic Alaska by participating in this workshop. Our first priority was to determine what worked for the Northwest Arctic Borough School District (NWABSD) and how this research project could dovetail with what students were already learning and doing. Assistant Superintendent Ralph King identified the Northwest Arctic Leadership Team (NWALT) as a partner for the work. NWALT is a borough-wide group of students composed of 2-3 school leaders per school who were identified by their peers. Engaging students in a meaningful process that did not seek to patronize nor minimize their inputs and efforts amplified their voices in responding to questions about possible future states of their communities. In 2040,

the year anchoring AFM's focal question, these students will be in their early forties, a time when they will be the opinion leaders and decision makers in their communities. Their perspectives now provide valuable insight into possible paths and futures for the community, and more importantly, some expectations they have of their future communities.

For communities to survive and thrive, valuing buy-in by youth has the potential to engage them in their communities at an early age (Brown & Henkin, 2014; Dougherty, 2004). Treating youth as involved and responsible citizens at a time when other community members might peremptorily label them as disengaged has the potential to flip the script.

Scenarios Development Workshops enable youth to be free from the standardized limits of their role as students and cast their imaginations widely. They offer a framework for exploring futures and the thinking to get there. They offer few if any answers, but their power is in the process. Students provide input and feedback based on their own experiences, learning, knowledge and community and cultural inputs. The scenarios development process emphasizes individual perspectives in collaboration and deliberation about possible paths to potential futures. Perspectives are elucidated, transformed, and adapted over the course of a scenarios development workshop.

6.3 Project Methodology and Development

My previous research, chapters 2-5, led me to wonder, how do youth view the role of public education in their communities, and how does public schooling contribute to youths' ability to be resilient in the face of perturbations in the social-environmental system into the future?

In Spring 2015 Drs. Hajo Eicken and Henry Huntington supported my grant proposal to the NWAB Science Steering Committee to develop and facilitate Arctic Futures Makers, an extension of our larger Northern Alaska Scenarios Project (NASP) project engaging the North Slope Borough and the Northwest Arctic Borough (NWAB) to specifically address high school students in the NWAB. Throughout my work on NASP, I advocated to include youth experts, residents and decision-makers from each borough. There were three main reasons their inclusion was important: 1) youth are more open to novel approaches in deliberation and scenarios development workshops; 2) youth are generally more open to innovative thinking; and 3) youth would be making decisions and raising families in the time periods we framed in the focal question of these scenario development workshops.

The first NASP workshop demonstrated a keen interest by young people (18-25) to participate in discussions about the future of healthy sustainable communities in their region. We partnered with the NWAB school district to hold a two-day scenarios workshop with students from across the borough to address "What do communities need to have healthy and sustainable communities in 2040?" Students used their knowledge about climate change, the landscape, and the people of their region to discuss what their home might look like in a few decades. The overarching goal was to create a sense of connection between Indigenous knowledge, high school learning, and "real-world" decision-making (e.g., borough level planning, the Alaska Arctic Policy Commission). The research goal was to understand the priorities of Arctic rural youth in relation to health and sustainability because they are often overlooked, yet vital to maintaining and revitalizing cultural, economic, and social knowledge. A specific goal for the students was to develop a sense of what they want for themselves and their communities by 2040, and begin making plans to reach those targets.

In planning for the Arctic Futures Makers workshop, I worked with the NWABSD Assistant Superintendent Ralph King and Head of Counseling Services Tony Jones. We discussed how this might be facilitated, logistics, and recruitment of interested high school students. We chose participants who were part of the Northwest Arctic Leadership Team, a youth organization with a representative at each school.

My research partner, Dr. Amy Lovecraft, and I decided to offer the workshop as a one-credit seminar class at UAF. We wanted to offer the students the chance to learn about futures studies while building a bridge to one of their possible futures as a student at the University of Alaska Fairbanks. We developed a syllabus (appendix 6) and required students to complete four assignments outside of the workshop. It proved an excellent way to not only think about the future, but also to work cooperatively with the students to start a possible path towards one future.

6.4 Participant Demographics

The workshop was held February 23-24, 2016. Ten NWAB students from the villages outside of Kotzebue flew into Kotzebue and were joined for the workshop by 11 students from Kotzebue High School. Twenty-one students took the pre-workshop survey and nineteen students took the post-workshop survey; one student dropped out at the beginning of day one and another chose not to complete the post-survey. As per demographic data from survey question 1-6: villages represented were Ambler, Buckland, Deering, Kiana, Kivalina, Noatak, Noorvik, Selawik, Shungnak. Students were in grades 10-12 and ranged in age from 16-18 years old. Of the 21 pre-survey participants, 33% were male (7), and 66% female (14). All students identified as Alaska Native and Iñupiat.

It was important that the workshop was creative and engaging; allowed for alternative assessment forms to check for understanding and triangulate validity of results; relied on a variety of ways of knowing to arrive at the final product; and was process- and outcome-oriented. I wanted to keep the guiding concepts of scenarios development fairly simple. Four guiding essential steps were adopted because these were important to spur students' thinking and also to generate useful results for the project and potential future projects.

Review past events and discuss current knowledge

1. Identify forces, factors, trends and important drivers that have an impact on the focal question
2. Identify critical uncertainties
3. Develop scenario characteristics

Based on these four steps, we developed an agenda (appendix 5) that addressed two steps per day.

6.5 Overview of Day 1 of AFM Scenarios Workshop- February 23, 2016

We used a classroom at the Alaska Technical Center in Kotzebue to assemble the students for the workshop. We were also afforded a breakout room, which proved useful especially during breakout group work and deliberations. We began with breakfast and followed that up with the pre-workshop survey (see appendix 14, page 324) to establish a baseline of data from students about how they thought about futures, community, schooling and learning, and opportunities and obstacles. The data from the pre and post-workshop surveys is analyzed more closely in the results section on page 224, below.

I then covered the logistics of the location, who we were, and expectations for the workshop and answered any questions the students had for us. It was important for us at this point to link this workshop with our larger project, the Northern Alaska Scenarios Project (NASP). We wanted to do this for two reasons, 1) it connected the students to their parents and elders who were collaborating with us on the larger-scale, multi-borough project, and 2) it gave us the opportunity to have an elder from their community come in and share his experiences, knowledge, and his perceptions of the rapid change he had witnessed over the last twenty-five years, the same length of time being considered via the workshop's scenarios development focal question: What is needed for healthy, sustainable communities in the Northwest Arctic Borough (NWAB) by 2040?

Our welcome was given by Fred Smith, an Iñupiat man and longtime community member who worked with us in NASP workshops 1 and 2. I believe the introduction by an Indigenous leader allowed the students to relax and built trust from the start. Mr. Smith, who had lived in the region since birth, spoke about his role in NASP and why the students had been invited to a similar enterprise. He introduced our research team, myself, Dr. Lovecraft and Ms. Kelsey Aho, a research assistant who was completing her M.A. in Arctic and Northern Studies at UAF and who helped facilitate logistics, paperwork, and student support. Dr. Lovecraft then gave an overview of NASP and AFM, an explanation of overlap between the two, and laid out what we hoped to accomplish for students and what new knowledge they might bring home to their communities by the end. We spent approximately thirty minutes explaining scenarios development processes and relevant terms to the group, and then gave the groups their focal question, "What is needed for healthy sustainable communities by 2040?" On easel boards the students wrote ideas and terms to describe what a healthy community in the NWAB would look

like. This sort of "visioning" was not done for the NASP. When thinking about the future, it became clear the students had a more difficult time separating the concepts of *what could happen* from *what I would like to happen*. To get over this hump, we had them do a visioning exercise.

Table 11 Visions of Future Communities by NWAB Youth

No drugs and alcohol	Friendships
Culture	More scholarships
No domestic violence	Technology
Values	Museums
Volleyball	Food
Eskimo games	Colleges- school close to home
Eskimo dancing	Doctors in community
The right to bear arms	Welding- vocation education/training
Subsistence life- FF ES	Engineering
Be content with what you have	Markets
Patience	Good health care- hospital jobs, opportunities
People who aren't selfish	More windmills FF
Adaptation	Hydroelectric FF
Education	Solar power FF
New schools	Growing food- farms ES
Relocate	Caribou ES
Wood stove	More local people making decisions
Outdoor games- FF ES	Colder winters-more snow ES
Knowledge of family tree	Peace
Knowledge of language	Communication-face-to-face cold be events
Respect for elders	Cooperation
Subsistence hunting FF ES	Respect
Solar energy FF	Faith in God
Beaches	Snow machines activities ES FF
Fresh berries	Love
Flowers	Positive
Transportation FF ES	Basketball
Virtual reality	Interaction
Clean water ES	Art
Places to play	Writing novels
Beautiful land-aesthetics ES	Careers
Hovercraft FF	Reading
Artificial intelligence	Having free time
Time travel	Success
Humor	Hard work
Companies-money $-jobs at home FF ES	Talents
Family	Positive interaction
Freedom- free to do what you want without harming anyone else	Water parks
Clean environment ES	More resources
Fishing	Safe environment
Camping	Clean air
Clean water	Communication among local and federal government
Lower prices for healthy foods FF	Shops
Culture	Strong churches and faith
Love for children	Traditions
Music	Music
Good paying jobs FF ES	Contentment
Stove oil FF	
Respect for nature	
Respect for others	
Sea ice	
Alternative energy	
Fishing	Code Key- Two key factors for Quadrant
Strong military- Navy SEAL	FF-fossil fuel dependent
Restaurants	ES-environmental stewardship dependent

Once the first few contributions were recorded, this activity began to calm nerves and the students came up with many ideas when thinking about the nature of their future communities. Although their contributions were definitely youth-centered, i.e. more scholarships, new schools, basketball, and waterparks, there was an unexpected commonality with the NASP adult participants' lists of desired community qualities. This was the point at which the students took over ownership in the scenarios process and verbalized their knowledge, thoughtfulness, and insight when envisioning the future of their communities.

We then brought Fred Smith back to the front to speak about the term "uncertainty," change, and life twenty-five years ago. Fred spoke about the immense changes that had occurred since 1990; one example he cited was that at the time there was one TV for the whole village with just a couple of channels, in comparison to the current explosion of choices. In particular he highlighted the improvements in housing, communications, and safety in the Kotzebue region. When speaking about the future he noted that this progress would always be informed by the place-based knowledge of Indigenous people. He talked about how current conditions are right for gathering data through partnerships with the university and state and federal organizations. Mr. Smith spoke about the need for education and said that elders, whether or not they themselves had completed their formal educations, supported the pursuit of education by youth. He identified education via vocational training and college degrees as vital and said students need to set goals and targets around education. Mr. Smith emphasized the importance of collaboration across boroughs as well as with the University of Alaska Fairbanks. We hoped Mr. Smith's reflections would stoke the students' imaginations of how possible the impossible might look in twenty-five years. In scenarios terminology, it was attempt to get the students to cast their nets as widely as possible by going a little backwards in time.

After lunch we started in on Step 2 in the scenarios methodology, the understanding of current data. We moved students toward understanding the concept of drivers and their role in social-ecological system (SES). We used the briefing book from the NASP project to give students a brief overview of the most recent data concerning 21 of the systems of the Arctic Alaska SES. We developed a scavenger hunt (appendix 8) to facilitate closer exploration of briefing books. It became clear that, for a shorter workshop such as Arctic Futures Makers, one key is to identify methods to abridge the copious amounts of data that were already summarized in the NASP briefing book. Students were asked to use their research and referencing skills to locate ten elements of SES related to descriptors they had generated for their Year 2040 communities, much like a data scavenger hunt. This is an educator strategy used to develop students' data-finding skills and to contribute to the scenarios narratives. Unfortunately, little data from the reference materials filtered into the scenario narratives, but this is likely another area for further development. We pressed the importance of working to incorporate useful data into the narratives, whether it was observational, Indigenous Knowledge-based or Western Science-based. This produced more concrete data in the subsequent scenario narratives.

Next, in groups of four to five, students were asked to identify forces, factors, and trends that would have an impact on the focal question, "what is needed for healthy sustainable communities by the year 2040?"

What follows is a transcribed exchange between a facilitator (F) and student (S) unpacking key factors:

F- *Let's take energy for example. We need more alternatives to get off the fumes of diesel. What do we think about as far as energy in each of your communities? Let's start with thinking about the amount that you use. What is it in the work that causes energy to change other factors or*

drivers? In the case of energy, what drives or what would make a change of any kind in the system? What do you pay for fuel now?

S- *$10.75 a gallon.*

F- *What might cause that price to go up or down?*

S- *The economy.*

F- *When you say that what do you mean? Is the price higher or lower? Is it the way they send it? What is the main reason energy is so expensive?*

S- *The way they get it up here.*

F- *Good. The cost of getting the energy to you is a driver. When you ship gas out to these communities, the shipping costs money. So, a major driver of cost of energy is generally the price of oil. How much does oil cost in the world? How does that affect Shell and their decision not to drill?*

S- *Cost of gasoline is too low*

F- *How much are folks willing to pay for energy? If it keeps getting cheaper and cheaper, will folks invest in solar? It's cheap to use the gas and oil, probably not. We're thinking about what drives these packages of things that you want in your communities. Come up with what you think in the world would change these things in your world. Demand for energy will drive the energy costs. If everybody wants something, costs will increase. Prices help us think about this component of energy, its value in the marketplace. Think about what this is that might change. What in the world might change in the future? What might take away the power of the borough to not make decisions?*

S- *Ruled by somebody else.*

F- *Things to think about related to what government does, what might give us more decision-making or less?*

This brief excerpt demonstrates the economic analysis and understanding necessary to unpack the workings of a key factor of one of the two drivers that guided the narratives of the futures. Students divided up into four groups and worked to unpack four other key factors they identified as important: outdoor activities, technology, healthcare and values.

After students reported on the highlights of their small-group discussions, we asked, "What is it in the world that is going to make changes in these topics?" Each of the four groups took on one of the four aspects students identified as key to the healthy sustainable community of their future. The topics they selected were 1) arts, 2) economic activity, 3) environment, and 4) food (see sample dialogue transcription below). When discussion wandered or lagged, we prompted them with the following questions:

- What in the next 25 years is going to cause changes in the community?
- What would cause more, what would cause less? For example, subsistence capacity?
- Write on your work's positive and negative impacts.
- What kinds of trends and ideas would cause a cleaner environment? And conversely, what would cause a less clean environment?
- What kinds of things would reduce jobs? Grow jobs?
- Within your groups, two of you could do positive impacts and two of you could do negative.
- When we think about these key factors, what are the most important things?

Students then recapped their discussions in a plenary setting with their colleagues in conjunction with their large Post-It note easel pads:

1. Food
Growing food—farms
Caribou
Subsistence activities-hunt/fish/gather
Lower prices for healthy foods
Fishing
Drivers
Positively influencing
1. More animals- species health could be more or less
2. More resources for market food
F- What would it take to get more food in markets? More people
S- Population will certainly be a driver for market food
3. Clean water for healthy food- rivers and sea as healthy habitat for fish\
4. More greenhouse=more food
5. Less money to ship food
6. Food for animals
7. Monitoring of animal pop, taking care of them
Negatively influencing
1. Sick animals- overhunting-
2. Oil spills-environmental disaster
3. Mine roads—caribou migration patterns—
F- Land development could be positive and negative
4. Industries moving in

2. Economic activity
Companies- jobs at home
Good paying jobs
Markets for goods
Lower prices for goods
More resources
Shops and restaurants
Drivers
1. Growth in population
2. Supply and demand for products
F- Kotzebue could produce hovercrafts- would people want to buy that? Yes, who doesn't want a hovercraft?
3. Money
F- How? Money is econ—money is tied to this---more and more people make money through jobs
4. Will to work
5. More than enough resources—if you have excess people will pay for it

6. Government—make laws and legislation to ban or promote something
Alaska Native artists-there are certain products that can't be sold, polar bear, whale meat

3. Environment
Clean water
Clean environment
Colder winters- "normal weather"
Sea ice
Drivers
1. Alternative energy—having more might remove dependence on diesel
2. More animals
F- What would help there to be more animals to eat?
S- Their health
3. Good management. —Things are safe
4. More pollution—that come from far away, that can come from a lot of places
5. Natural disasters
6. Government's management of the environment

4. Arts
Art
Writing novels careers- reading
Music
Museums
Drivers
1. The economy
More people buying in a good economy
2. Whether there is a war going on or not
3. Whether or not people are talented,
F- Practice and education as factors
4. Number of artists
How many artists need to be in a community to have a vibrant artistic community
5. Knowledge of language
F- Why might that matter to the arts? If we're thinking about the arts skill sets are often tied to the arts
6. Availability of materials
F- Which could be animals?

One group identified positive and negative drivers while other groups listed them out as one list of drivers. The point was to identify the causal relationships across scales of the aspects important to community sustainability. At this point in the day, participants were becoming more skilled in identifying the relationships between key factors and important qualities of a

community, so we moved to narrow the list of key factors students wanted to include in the scenarios exercises. Descriptors of qualities of the future community were ordered into like sectors by the research team, for voting by the students. As a group, the students brainstormed a list of drivers that might impact the list of desired qualities of future NWAB communities. The following are the important or key drivers that students identified, collated into categories of driver similarity with the help of the students identifying patterns and organizing.

Figure 18 Students Voting on Key Factors

Students spending (prioritizing) $10 million budget (for each student) on research and work efforts to better understand key factors identified by students.

Table 12 Arctic Futures Makers (AFM) Key Factors Sorted

Energy	**Values**
Alternative	Culture- Iñupiaq Values
More windmills	Humor
Solar power	Freedom
Woodstove/Stove oil	Respect for elders
	Knowledge of family tree
Governance	Cooperation –could be events
More local people making decisions	Positive interaction
Right to bear arms	Faith in god- Strong churches and faith
Strong military	Love
Communication among local and federal government	Be content with what you have
Relocation	Patience
	Unselfishness
Outdoor activities	Love for children
Places to play	Respect for nature
Outdoor games	Respect for others
Beautiful land	Peace
Beaches	Hard work
Sports- basketball/volleyball	Success
Eskimo games	Traditions
Eskimo dancing	
Water parks	**Food**
	Growing food—farms
Technology	Caribou
Hovercraft	Subsistence activities-hunt/fish/gather
Time travel	Lower prices for healthy foods
Virtual reality	Fishing
Easy Transportation	
Snow machines & activities	**Economic activity**
Artificial intelligence	Companies- jobs at home
	Good paying jobs
Health care	Markets for goods
Good health care	Lower prices for goods
Doctors in community	More resources
No drugs and alcohol	Shops and restaurants
No domestic violence	
	Environment
Relationships	Clean water
Family	Clean environment
Friendships	Colder winters- “normal weather”
Communication- face to face	Sea Ice
Education	**Arts**
New schools	Art
More scholarships	Writing novels careers- reading
Vocational education -welding	Music
Adaptation	Museums

These drivers look similar to the list that adult participants created in NASP. Most of the drivers fell fairly close to present-day norms and trends, with the exception some of the imaginative drivers in the technology category.

Students then voted with dots to prioritize 1) which drivers would be most important, and 2) which drivers they knew least about, as a proxy for which were most uncertain. These twelve key factors came out on top from student voting.

Table 13 Top Twelve Key Factors as Voted by AFM

Alternative Energy
Right to Bear Arms
Local Decision-Making/Government to Government Communication
Beautiful Land/Clean Environment
Outdoor Activities (including snow machines)
Good Accessible Healthcare
Iñupiaq Values
Scholarships/Access to Education
Subsistence
Good jobs
Sea Ice
The Arts

Students voted in a similar method about uncertainty, that is, the things that they knew least about. They identified these six factors as most uncertain:

Table 14 Six Key Factors Identified as Most Uncertain

Energy - woodstove/stove oil
Economic activity- more resources
Alternative energy
Growing food and farms
Iñupiaq Values - Be content with what you have
Writing novels & reading careers

Table 15 Key Factors of AFM vs. Adults (NASP) The key factors that students generated were less technical but mirrored many of the key factors generated by their adult counterparts generated during the Northern Alaska Scenarios Project.

Arctic Futures Makers vs. Adults

Students'
Key Factors/Key Drivers

1. Alternative Energy
2. Right to Bear Arms
3. Local Decision-Making/ Government to Government Communication
4. Beautiful Land/ Clean Environment
5. Outdoor Activities (including snow machines)
6. Good, Accessible Healthcare
7. Iñupiaq Values
8. Scholarships/ Access to Education
9. Subsistence
10. Good jobs
11. Sea Ice
12. The Arts

Adults' Cross-Borough (NSB/NWAB)

1. Iñupiaq Values
2. Land Mgmt/Ownership
3. Subsistence Security
4. Sustainable Energy
5. Regulatory Process Participation
6. Interaction of Levels of Governments
7. Substance abuse and related crime
8. Intersectional Community Engagement
9. Preparation of teachers and school administrators
10. Climate change at the global and regional scale
11. Access to quality healthcare
12. Transmission and recognition of Indigenous knowledge
13. Demographics
14. Cost of Living
15. Pan-Arctic Collaboration
16. Tribal Governance
17. Access to and affordability of housing
18. Local Determination
19. Language Proficiency
20. Local Access to Education for College, Career, and Livelihood Readiness
21. Access to Markets

The students' list of key factors demonstrated a closer connection to the land, activities, and people in some ways that the adult list did not. The students thought broadly and widely while adults were more specific in naming the factors, with a special focus on policy relevance. The relations between the two lists are remarkable in their similarities across generations. The only outliers were the identification of housing and collaboration as key factors by the adults, and the students' emphasis that the arts maintain status as a key factor. One might identify "right to bear arms" as an outlier but when the young men were asked to unpack the importance and what "the right to bear arms" meant, much was made about subsistence access, security, and self-

governance. One should not underestimate the vital importance of firearms as a tool for subsistence when store-bought food is so expensive. These right-to-bear-arms aspects fit into many of the key factor categories on the adult list, but the adults' items have different nuances, such as "control over land management" or "subsistence disputes."

The results indicate the students and adults who participated in these workshops share similar ideas in terms of the key drivers of future resilience. The similarities in data between Arctic decision makers (NWAB and NSB in the NASP project) and Arctic youth are striking and make a strong argument for the value-added potential of youth engaging in the conversation. The youth offered a breadth and intimacy with the issues that their adult counterparts seemed a step removed from. The youth are still at work and play, often on the land. This playfulness and lack of defined roles emboldened students to truly imagine and offer up horizon scanning, key factors and possible paths that were not reflected in the adult group's output.

6.6. Overview of Day 2 of AFM Scenarios Workshop- February 24, 2016

After reflecting on Day One accomplishment, we set off to envision the future by identifying the most important and impactful drivers and uncertainties. Day 2 was more fluid based on how Day 1 had progressed, in part because we had to scale back the amount of work we were going to be able to accomplish in our short two-day workshop together. The main Day Two objective was to have students craft four narratives in four groups of five and present these narratives back to their colleagues in plenary. Ideally we wanted students to consider implications and important indicators connected to and contingent upon their narratives and outcomes, but time ran short and students' enthusiasm and endurance did as well.

Next, the facilitator explained scenario narrative writing and our methodology: we physically explored a future together using the room divided into four quadrants as four futures as an analogy. Each table was a different future. To reengage their energy, rather than push them more on the most uncertain factors (noted above), we organized around two axes drawing on topics they had indicated were important, but also ones about which they seemed to have enough knowledge to explore deeply. These were "environmental stewardship" (what extent of care for the environment is there related to rules and values?) and cost of fossil fuels (are the costs of oil, gas, and coal high or low on the world market?) These two drivers incorporated impacts of many of the key factors that came to light in the students' vote from the previous day.

Table 16 Scenarios Table/Group Assignments

Table/Group	Driver Combination
1	High fossil fuel costs and strong environmental stewardship
2	High fossil fuel costs and weak environmental stewardship
3	Low fossil fuel costs and weak environmental stewardship
4	Low fossil fuel costs and strong environmental stewardship

Students in each group grappled with the question, what does the year 2040 look like in our quadrant? Then we refined the results as a whole group, bringing in two of the other key factors into each of the quadrants or futures or narratives. It was important that the students brought the key factors back into light in the 2040 version of their community. Students then took the list of key factors, cut them up, pasted them on poster paper and considered what these two drivers' impacts would be on each of them by 2040. Next the facilitator had students develop a character for the students' scenario narratives, either fictional or based in fact. This

gave students the chance to bring the scenario writing activity down to a more personal level and to engage creatively and imaginatively. It also provided more data on the students' interpretations of what kind of folks would thrive in a 2040 determined by the intersections of environmental stewardship and cost of fossil fuels.

Utilizing a strategy called jigsaw, one traveller from each group travelled to each of the other groups to see how the future played out for them. Then the traveller brought back the news of the other futures. We then broke for lunch.

After lunch, it was time to begin developing the scenario narrative. We began with an activity called backcasting. Each group started in 2040 and imagined how they might have arrived in this future via the drivers, and using the future they had imagined for 2040 under the guidance of the two drivers. Then we asked them to go back to the present and assess the current situation based on their preexisting knowledge and what we had talked about in the previous day's session in terms of current events and trends. Now that they had some ideas of what 2040 might look like under these conditions of fossil fuel costs and environmental stewardship, they summarized those details and entered them in the space for the 2040 on the timeline. They then worked backwards to the present, adding events that led to successive events. We used the timeline as one of many different props to inspire a story. We each started at a table to get groups writing, brainstorming and narrating a path toward the futures of 2040, beginning-2016-ish, ending -2040-ish.

We all took a well-needed break from all this imagining and thinking and toured the Alaska Technical Facility (ATC) to think about students' futures in the region and how ATC might support those. ATC offers courses in nursing, heavy equipment operation, welding, carpentry, and the culinary arts. After a nutrition break we began planning out the final

presentations: each group presented a visual, a narrative, and a verbal exploration of the future via the drivers they were asked to explore.

6.7 Results- Scenario Outputs

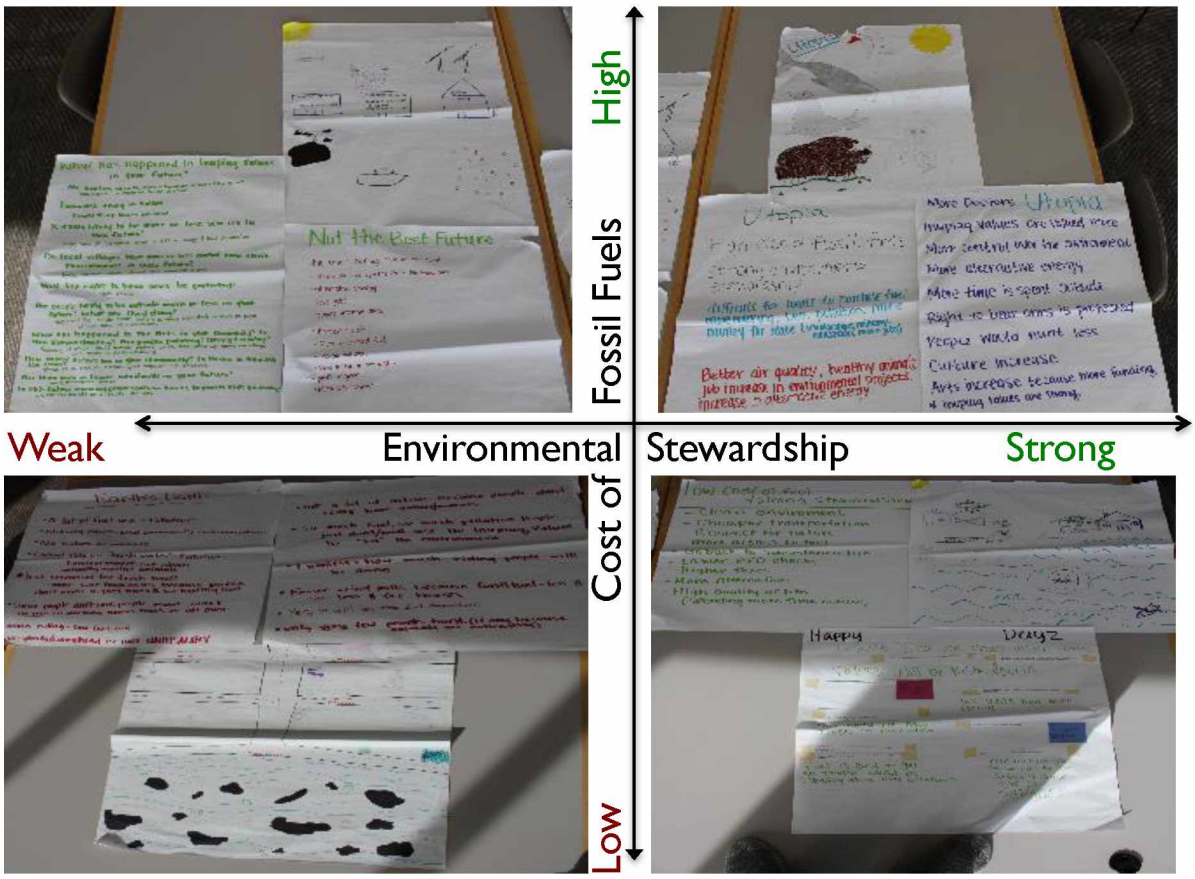


Figure 19 Whole Quadrant View of Students' Scenario Workshop Outputs

Table 17 Quadrant Key

Quadrant 2	**Quadrant 1**
Quadrant 3	**Quadrant 4**

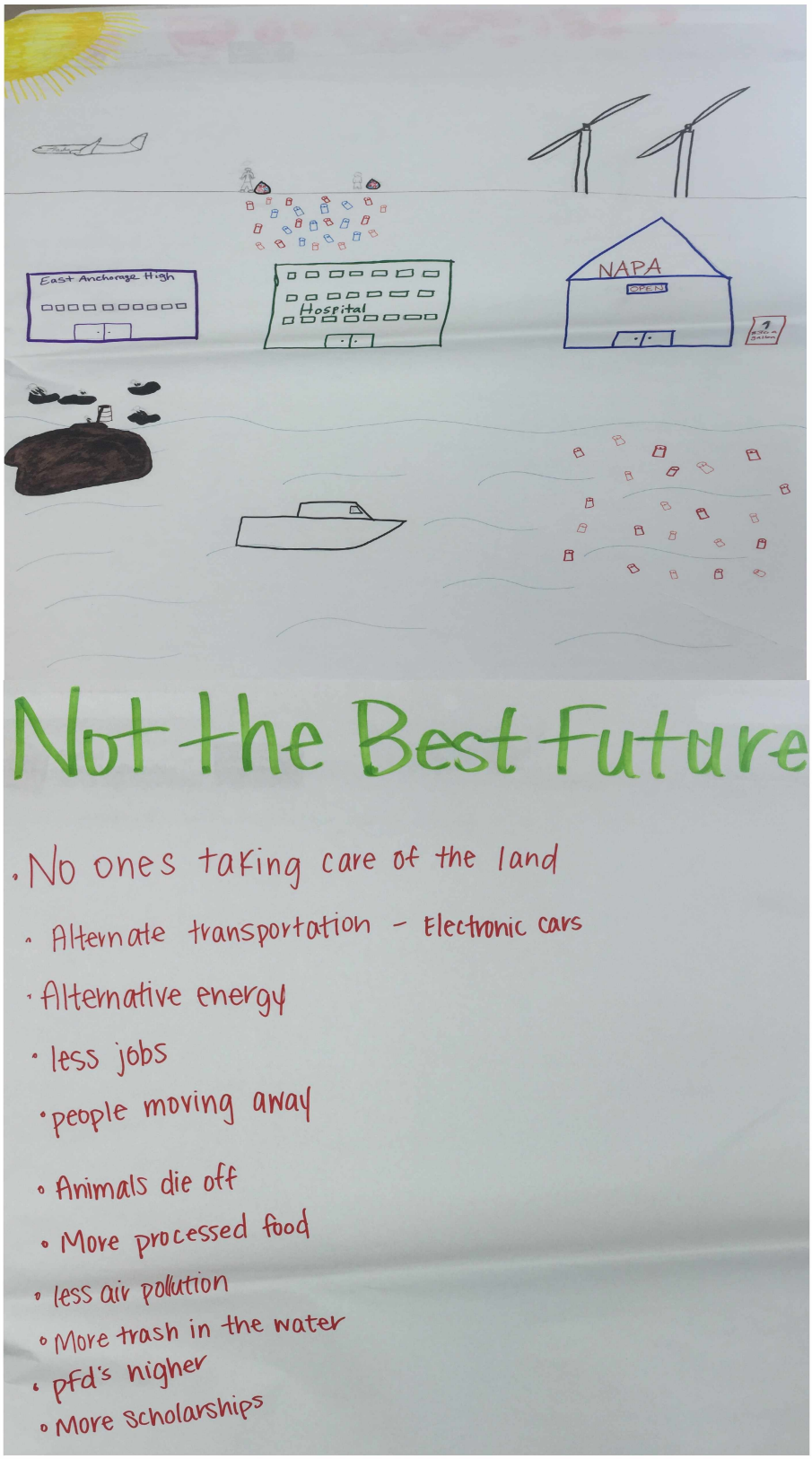


Figure 20 Quadrant 2: High Cost of Fossil Fuels and Weak Environmental Stewardship (Drawing- top, Qualities- bottom)

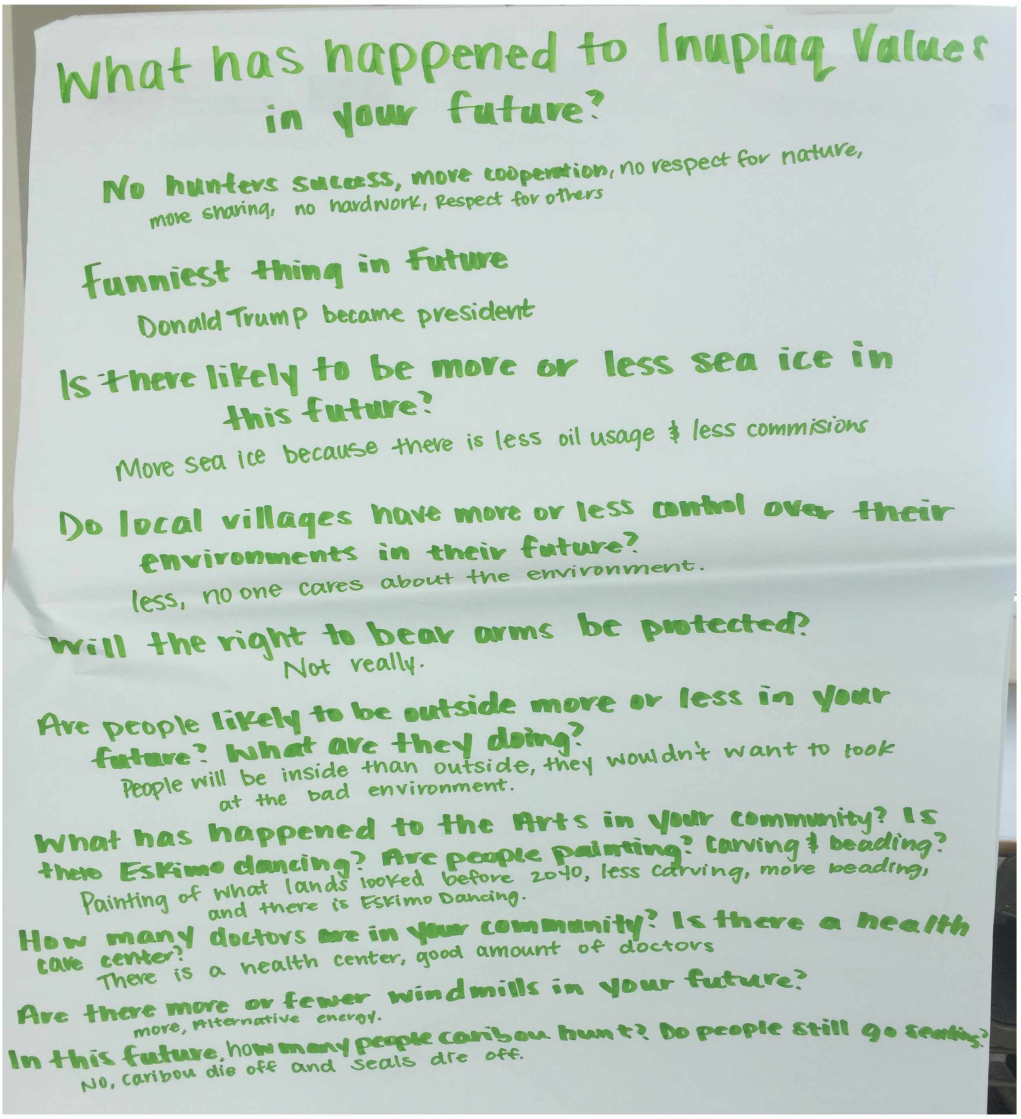


Figure 21 Q2: High cost of fossil fuels and weak environmental stewardship (Qualities Continued)

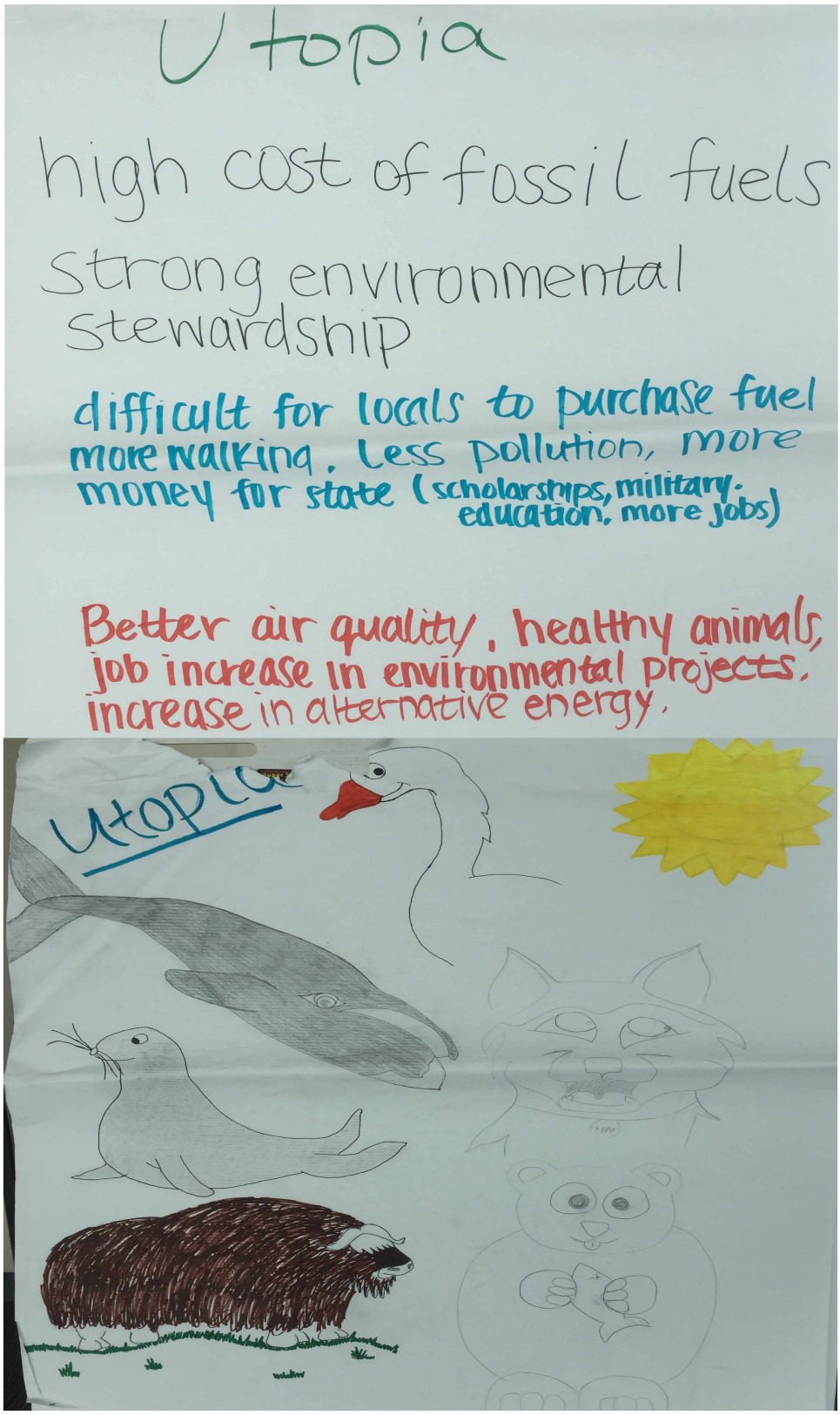


Figure 22 Quadrant 1: High Cost of Fossil Fuels and Strong Environmental Stewardship (Qualities, Drawing)

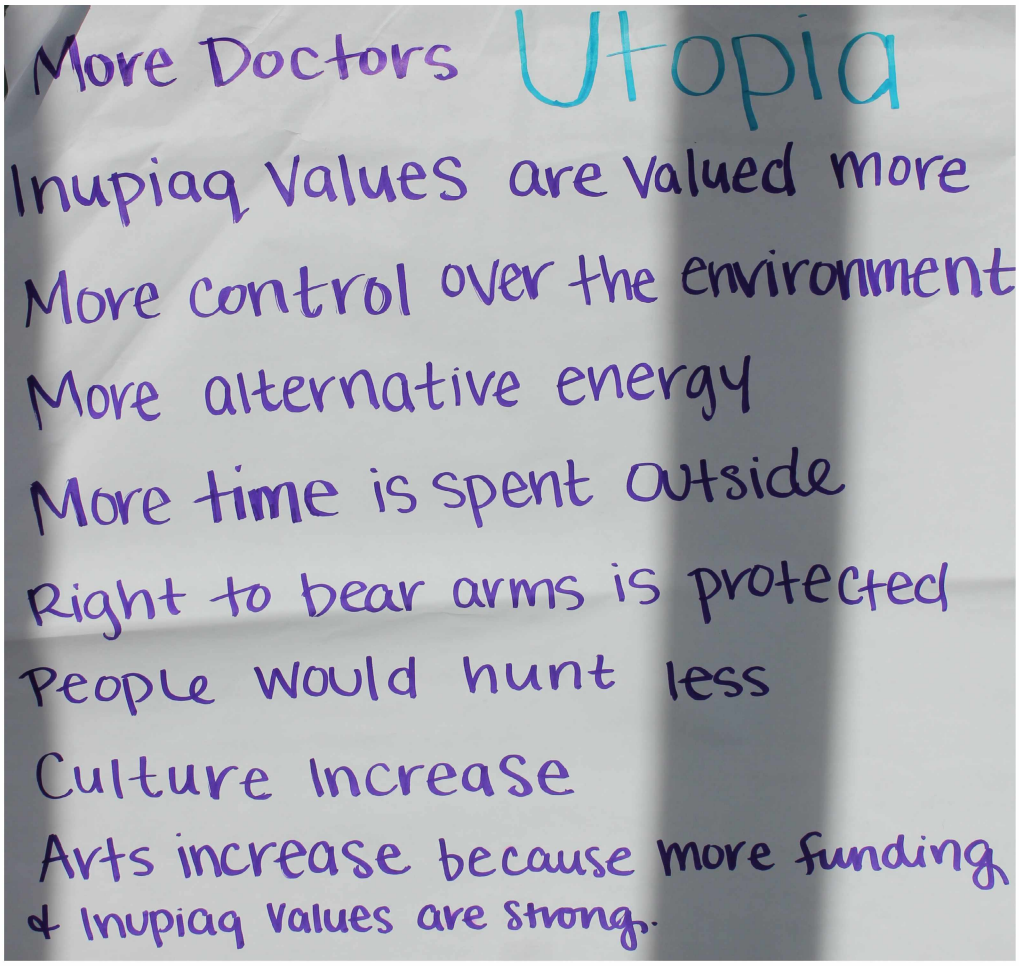
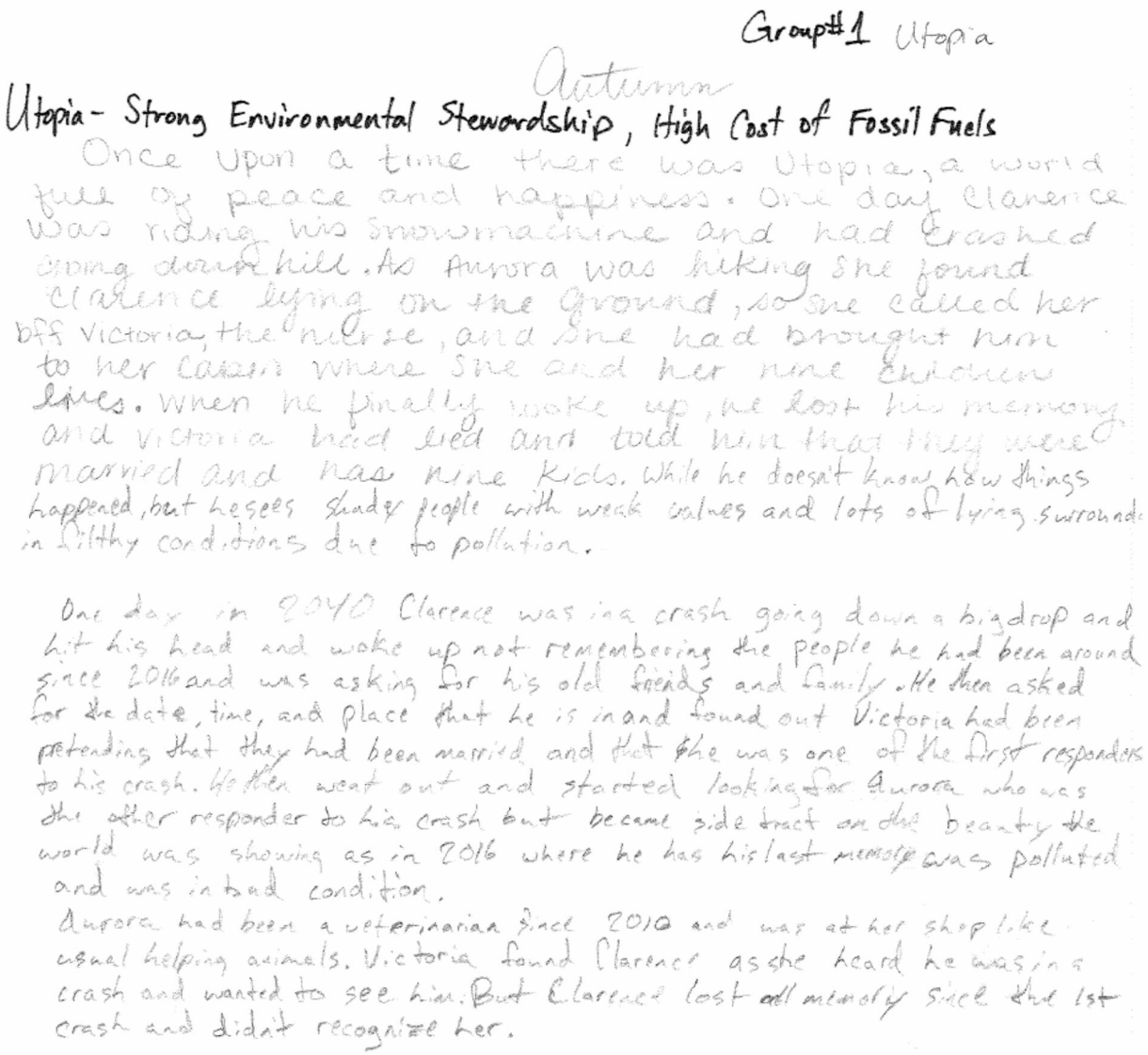


Figure 23 Q1: High cost of fossil fuels and strong environmental stewardship (Qualities Continued)


Group #1 Utopia

Autumn

Utopia - Strong Environmental Stewardship, High Cost of Fossil Fuels

Once upon a time there was Utopia, a world full of peace and happiness. One day Clarence was riding his Snowmachine and had crashed going down hill. As Aurora was hiking she found Clarence lying on the ground, so she called her bff Victoria, the nurse, and she had brought him to her Cabin where she and her nine Evilcious lives. When he finally woke up, he lost his memory and Victoria had lied and told him that they were married and has nine kids. While he doesn't know how things happened, but he sees shady people with weak values and lots of lying surrounded in filthy conditions due to pollution.

One day in 2040 Clarence was in a crash going down a big drop and hit his head and woke up not remembering the people he had been around since 2016 and was asking for his old friends and family. He then asked for the date, time, and place that he is in and found out Victoria had been pretending that they had been married and that she was one of the first responders to his crash. He then went out and started looking for Aurora who was the other responder to his crash but became side tract on the beauty the world was showing as in 2016 where he has his last memory was polluted and was in bad condition.

Aurora had been a veterinarian since 2010 and was at her shop like usual helping animals. Victoria found Clarence as she heard he was in a crash and wanted to see him. But Clarence lost all memory since the 1st crash and didn't recognize her.

Figure 24 Q1 (Continued): High Cost of Fossil Fuels and Strong Environmental Stewardship Narrative

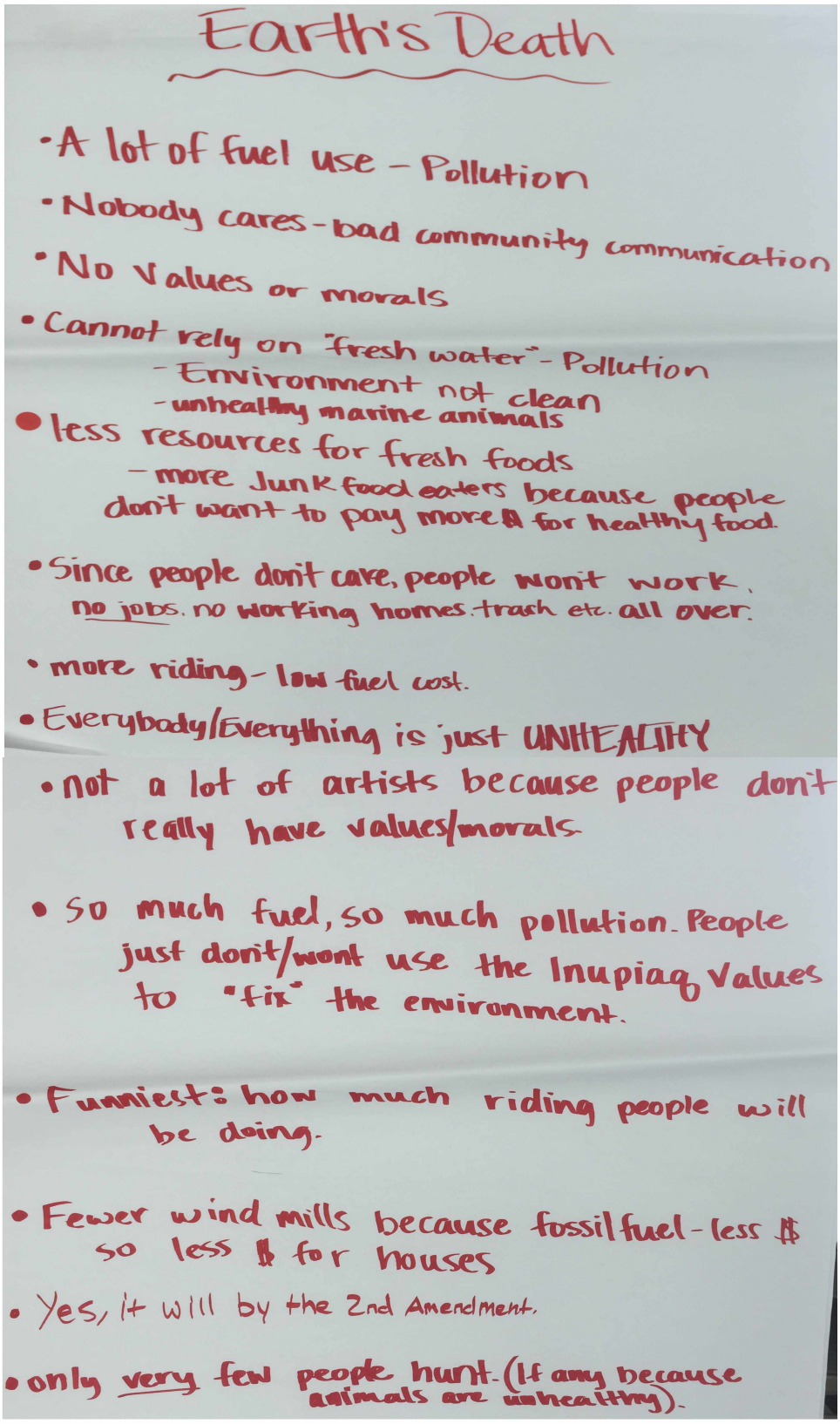


Figure 25 Quadrant 3: Low Cost of Fossil Fuels and Weak Environmental Stewardship Qualities

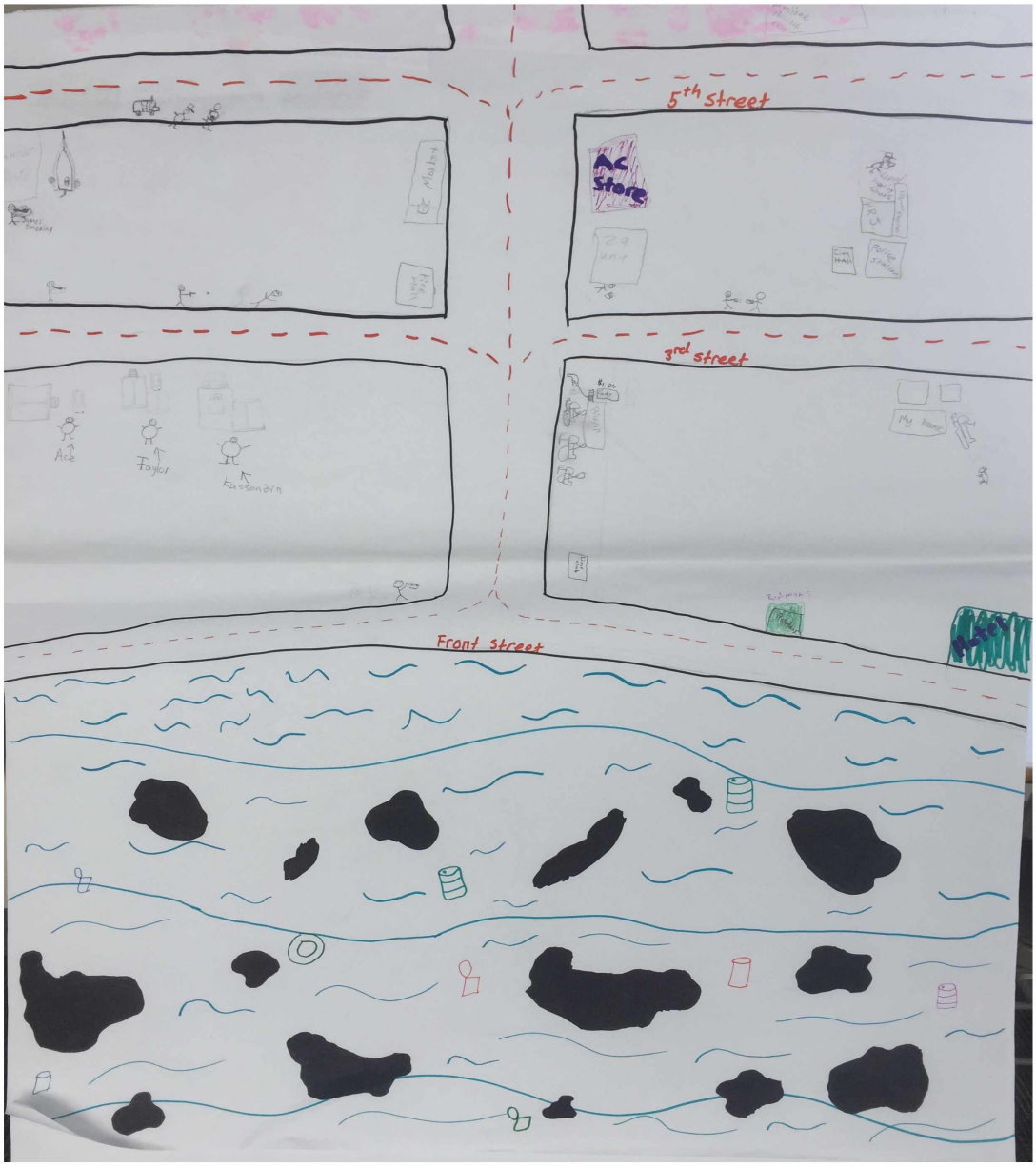


Figure 26 Q3 (Continued): Low Cost of Fossil Fuels and Weak Environmental Stewardship Drawing

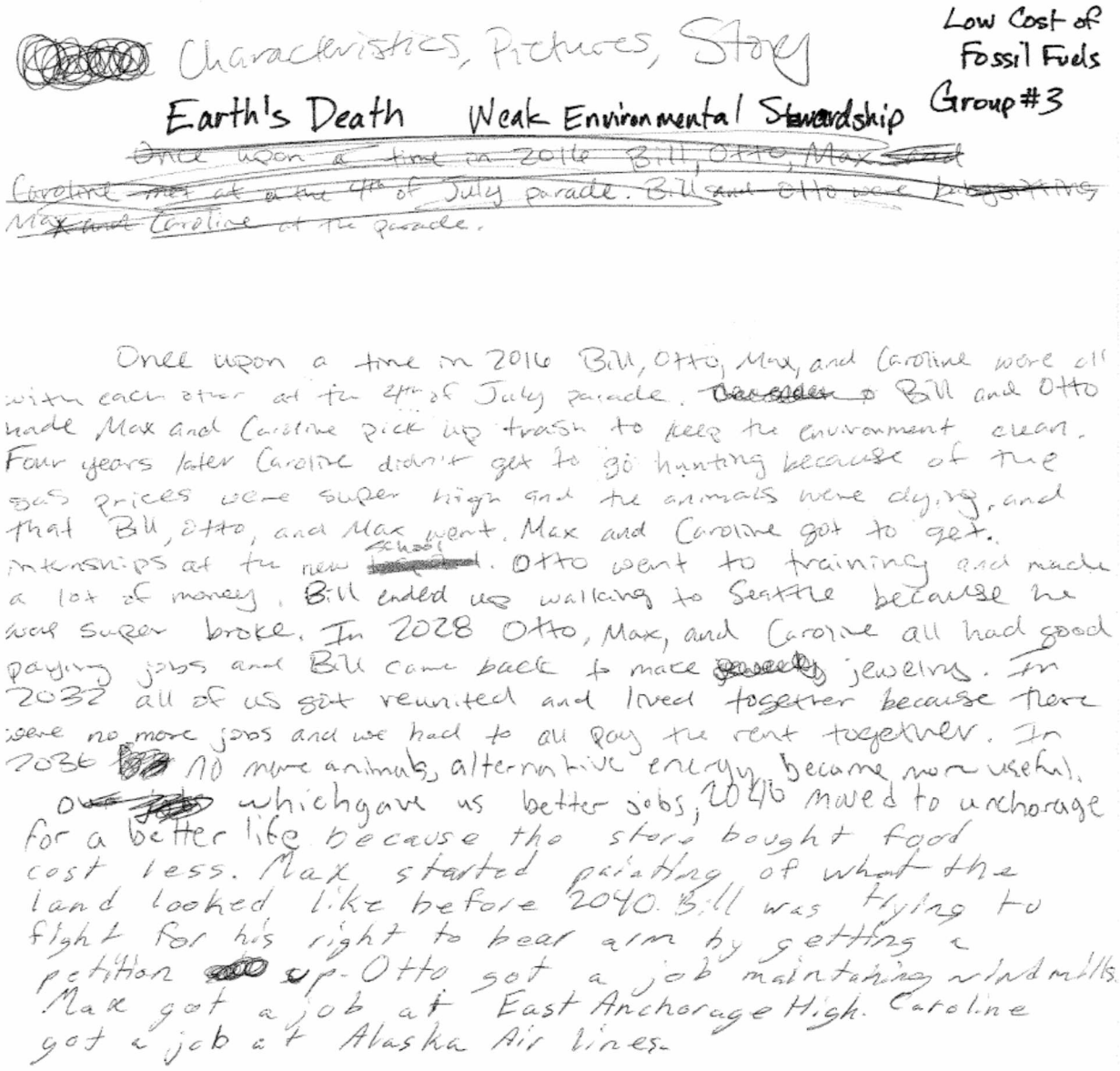
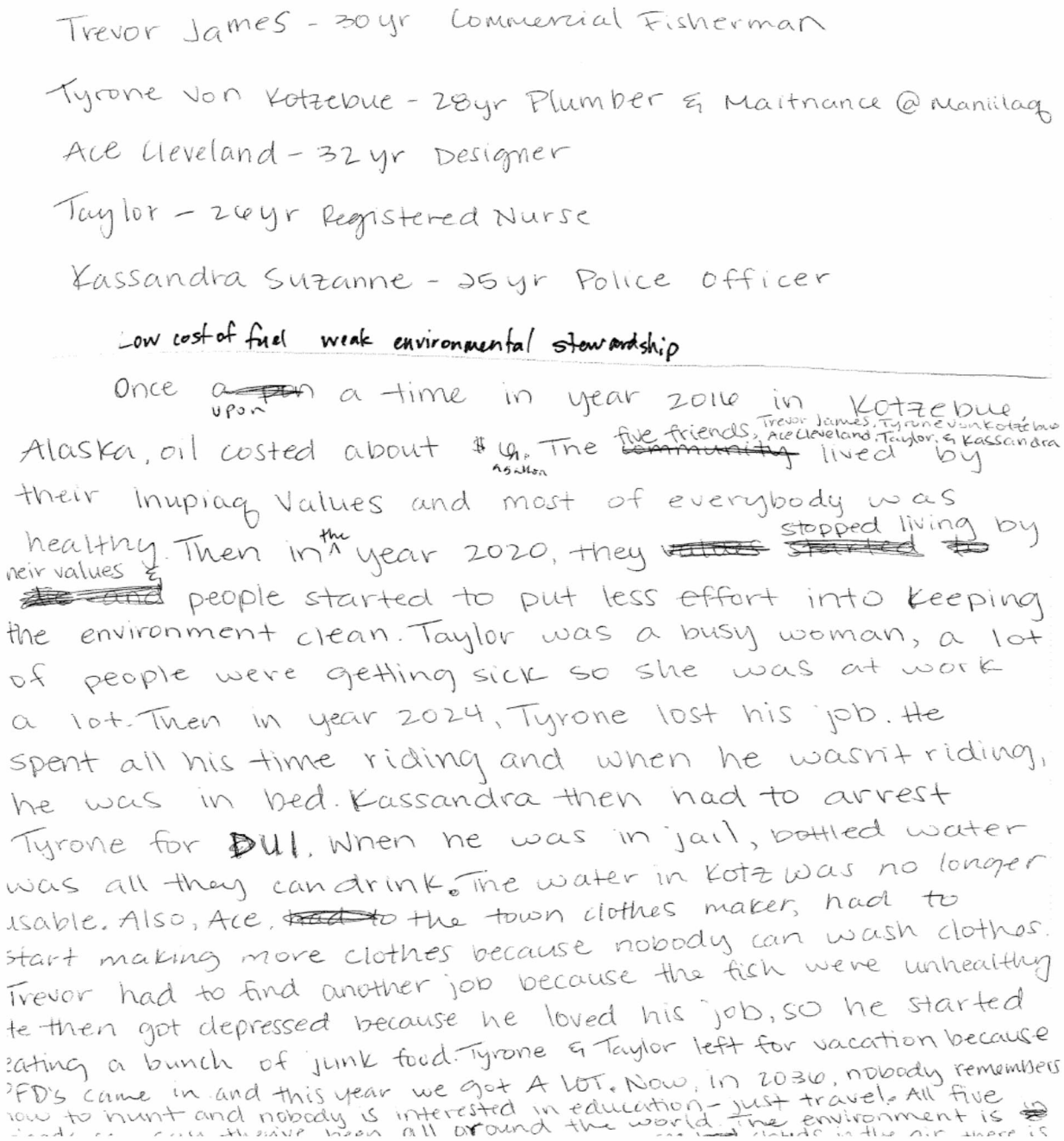


Figure 27 Q3 (Continued): Low cost of fossil fuels and weak environmental stewardship Narrative


Trevor James - 30yr Commercial Fisherman

Tyrone Von Kotzebue - 28yr Plumber & Maitnance @ Maniilaq

Ace Cleveland - 32 yr Designer

Taylor - 26yr Registered Nurse

Kassandra Suzanne - 25yr Police Officer

Low cost of fuel weak environmental stewardship

Once upon a time in year 2016 in Kotzebue Alaska, oil costed about $4. a gallon The five friends, Trevor James, Tyrone Von Kotzebue, Ace Cleveland, Taylor, & Kassandra lived by their Inupiaq Values and most of everybody was healthy. Then in the year 2020, they stopped living by their values & people started to put less effort into keeping the environment clean. Taylor was a busy woman, a lot of people were getting sick so she was at work a lot. Then in year 2024, Tyrone lost his job. He spent all his time riding and when he wasn't riding, he was in bed. Kassandra then had to arrest Tyrone for DUI. When he was in jail, bottled water was all they can drink. The water in Kotz was no longer usable. Also, Ace, to the town clothes maker, had to start making more clothes because nobody can wash clothes. Trevor had to find another job because the fish were unhealthy te then got depressed because he loved his job, so he started eating a bunch of junk food. Tyrone & Taylor left for vacation because FD's came in and this year we got A LOT. Now, in 2036, nobody remembers ow to hunt and nobody is interested in education- just travel. All five ...been all around the world. The environment is ... clouds in the air, there is

Figure 28 Q3 (Continued): Low cost of fossil fuels and weak environmental stewardship Student Narrative

These are the last lines that were cut off on the end of the scan from the previous page:

"how to hunt and nobody is interested in education- just travel. All five friends can say they've been all around the world. The environment is in bad shape; you can see clouds in the air, there is also trash everywhere you look."

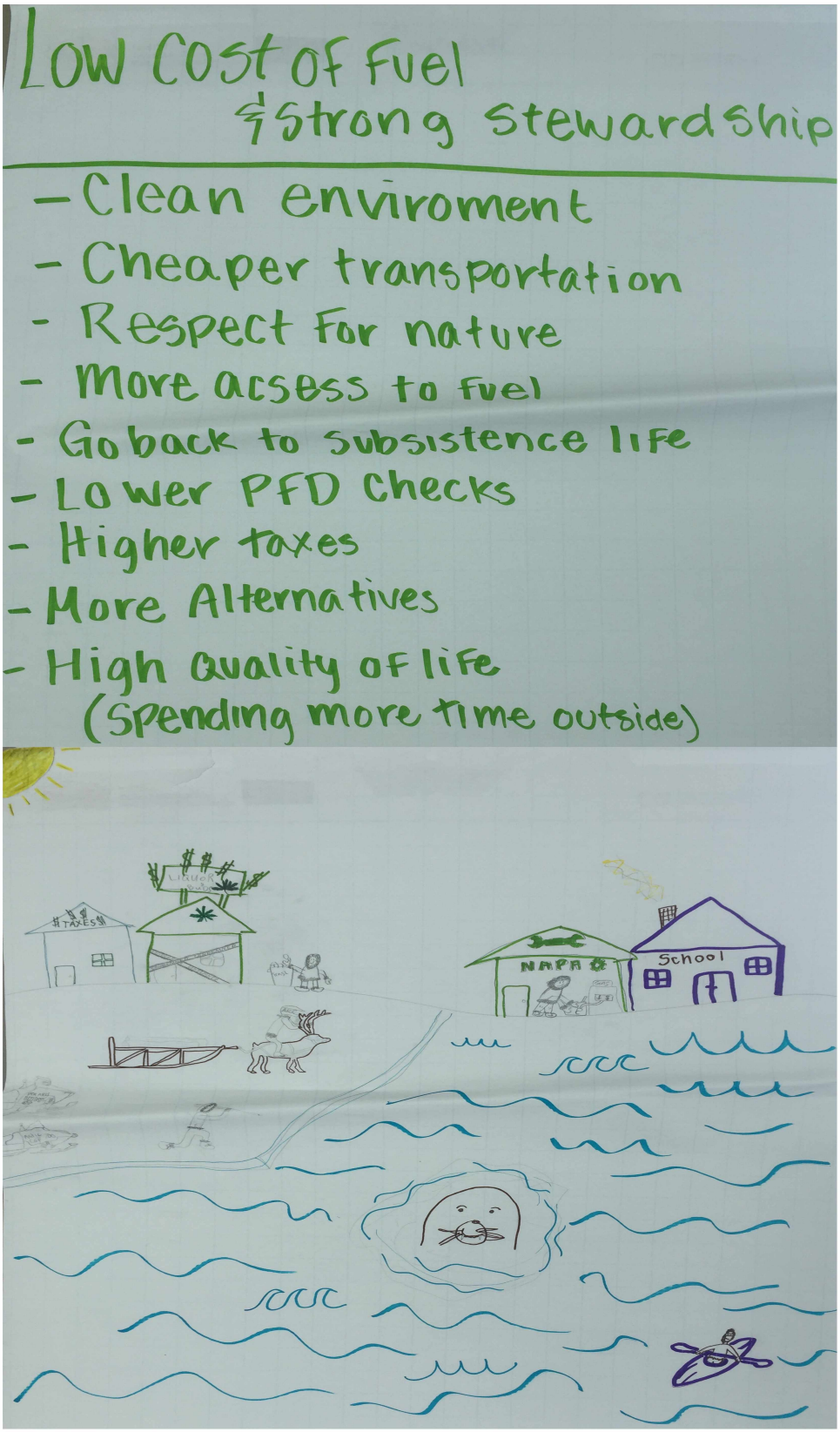


Figure 29 Quadrant 4: Low Cost of Fossil Fuels and Strong Environmental Stewardship Qualities & Drawing

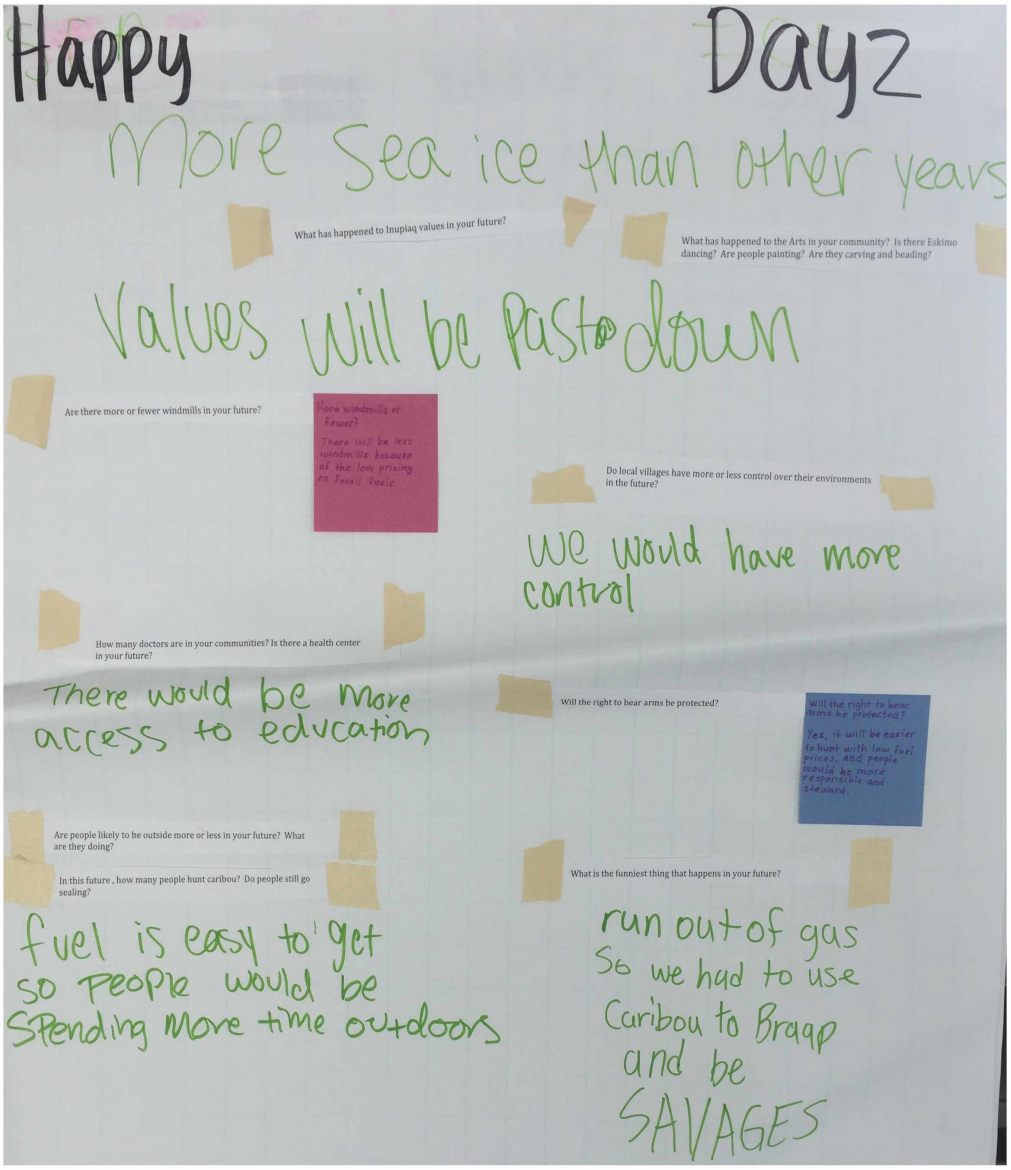


Figure 30 Q4 (Continued): Low Cost of Fossil Fuels and Strong Environmental Stewardship Qualities

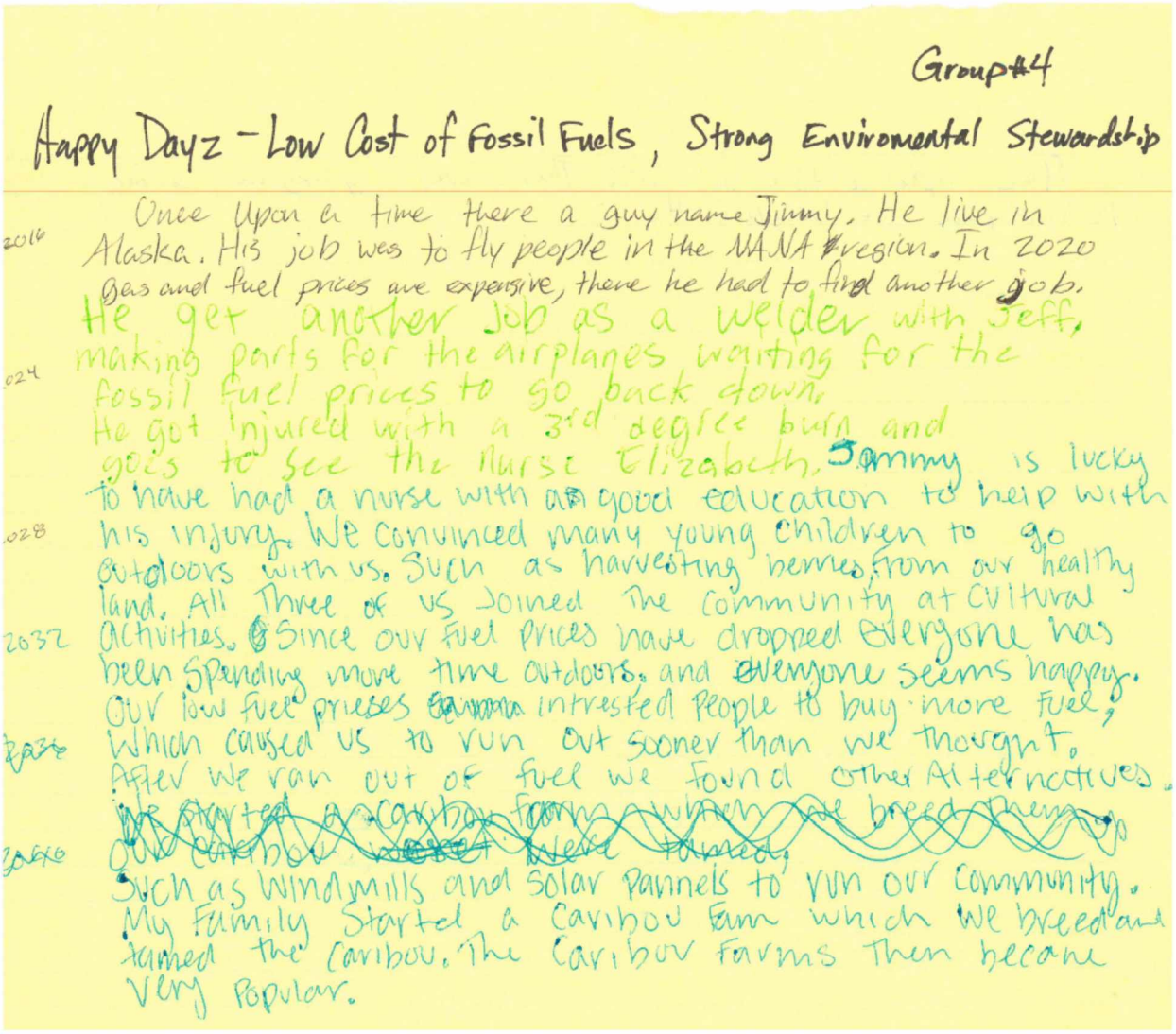


Figure 31 Q4 (Continued): Low Cost of Fossil Fuels and Strong Environmental Stewardship Narrative

6.8 Analyzing Data and Depth of the Experience

Activity Analysis: Character sketch of a thriving character in 2040

The elements of a thriving character in 2040 as defined by students offer a fascinating lens into what students envision for themselves, both in terms of occupations and personal pursuits. I like to call them pathways to resilience. If community members and decision-makers are not hearing these voices and needs then the likelihood for sustainable and healthy communities to 2040 will be small. These inputs should be important considerations for decision-makers and community members as they debate resource allocation, community programming, or even school curricula. The threads or resilience are present in the responses as well, for example, hugging and friendliness, balancing cash and subsistence, and seeking funding for college. Below are the ages, jobs and pursuits of the students' inhabitants of 2040:

1. 40-Regional/area manager at a local corporation, knowledge of anthropology, geography "had a good education," Alaska Native and can subsistence hunt, good relationships at work and in the community

2. 40-Novelist- coffee shop owner/barista, knows his boss from Doug corps

3. 28-plumber and maintenance at Maniilaq, wrenching on stuff

4. 43- time traveler, pro-sledder

5. Veterinarian- 22- lives in Hawaii, place to be-walk-in closet to read "I want to be first female president." …timeline- Alaska becomes own country 2034.

6. Victoria Trump, 42- polite nurse, 9 kids, no husband- crochet a hat in 10 minutes

Alaska becomes own country

7. 25- police officer, space-swing tied to tree branch in backyard

8. 30- commercial fishing and carpentry, hunts, lives in Sisaulik, commutes to Kotzebue for work occasionally, build cabins

9. 26- registered nurse, likes to read, solar-powered house, greenhouse

10. 42- maintenance specialist, loves to hunt fish and chop wood, greets everyone with a hug or a handshake, lives off the land and has the skills to survive on land or water

11. 32- pilot, can read minds, plays basketball, makes hats and headbands, loves to fly over the ocean

12. 32- teacher, hunts, fishes, and camps, enjoys baking dessert, good Eskimo dancer and making ulus, helps others in need, rely on food from the land not just the store

13. 19-learning to become a doctor, spoiled, parents paid for college, ride hovercraft

14. 32- doctor, cooking, sewing, knitting, got a good education

15. 42- pilot, knows everything about animals, likes to cook and adventure, picking berries on the tundra

16. 38, fisherman, hunting, fishing, boating, snow machining, one scenario outcome for his character: Joe's kids don't get as good of an education as his dad wanted him to.

17. 24- catching big game on the tundra to live, lost family to pack of wolves, got some magic leaves, can make weapons-hatchet, knife, spear, bow and arrow, all out of rock caribou skin and wood, alone in the wilderness living off the land

When reflecting on this process in small groups, a thoughtful student noted that, "our American dreams are not so different even in rural Alaska thanks to TV." I would argue that these students' dreams are different from those perpetuated by the media in that they - like a more appropriate educational system - distribute energy to the roots (culture) as well as toward the branches and leaves (learning Indigenously and via public school, dreaming, growth, the future).

To have students think deeper about the causes and effects playing out on the path from 2016 to 2040, we had them modify the character narratives to push characters into living and surviving in the four narrative outcomes. Character that students developed thus took a role in their scenarios as explored, demonstrating students' first response adaptation strategies in case of trouble in the future scenarios.

1. Travels the world and plays volleyball

2. Be lucky for a job, keep a job, better hold a job

3. Move to a different city, stay safe and use masks while working

4. Move to somewhere else to hunt and cooperate, work for alternative energy for my racing career, buy a hybrid, be part of stewardship.

5. Help people deal with Donald Trump's presidency, help bring people together, bring culture back, help promote healthy lifestyle, help adapt to more sea ice.

7. Take better care of our land, learn from people who know about the land, do more stuff to make a clean environment.

8. Work on making windmills to make money, buy a lot of gas while cheap and then move to camp, move away because there is no gas.

9. Education accessibility via more scholarships.

10. Education, healthy change people's thoughts, clean environment, keep traditions, fast transportation, care with weapons.

11. Energy efficient snow machine, live out in the wild, come to town for gas and to sell furs, work hard live life and live my life.

12. Finish high school, attend college and finish, get welding training, make mullah$, ride snow machines, save money for school instead of buying fuel for riding, make money, buy a lot of gas because of low pricing and ride.

13. Fish for hobby, wood stove to reduce reliance on fossil fuels, walk, clean drinking water and healthy food.

14. Move to a different community, stay safe and wear masks, work on values and morals, work a 2nd job, have less children, start encouraging children to live a healthy lifestyle.

The resilience strategies and methods these students already possess are amazing. We had expected that these exercises in exploring resilience would be new to the students. The terminology may have been new to them in some ways, but I would argue that these students came armed with their own strategies for resilience in their communities amongst a global backdrop of uncertainty for their local social-ecological systems and culture. Response no. 14 above truly captures this; the whole reason I wanted to embark on this project was to add value to the importance of futures thinking and students' futures. Why not start that resilient lifestyle now?

6.9 Arctic Futures Makers Survey Data

In order to gain anonymous feedback from students about resilience, education, and their communities, we administered pre- and post surveys. The surveys differed slightly from each other: some general questions, such as demographics queries, were only asked once, while other questions were repeated on both surveys to capture the effects of the workshop. They carried the same protections for the young people as did NASP surveys; surveys were given

random numbers and only those cleared through the UAF Institutional Review Board could match numbers to names. This data will remain confidential forever.

6.9.1 Survey Results

On the Pre-workshop surveys students were asked 19 survey questions in total: six demographic questions (results noted at beginning of this chapter), seven Likert scale responses and six open-ended questions. This combination was designed to generate some specific comparable results as well as to let the students list and explain aspects of their lives and education as they saw fit. Below is a discussion of those questions that could be directly compared to test the effects of the workshop on the students.

Open-ended Question: When you think about the perfect healthy sustainable community in Alaska, what 5-10 words come to your mind that would describe it?

Table 18 Healthy and Sustainable Community Descriptors Pre-workshop Responses

Pre-workshop Responses
-Nature or natural-5 students mentioned
-Welcoming-4
-No/low drinking-3, no drugs-2
-Culture, cultural values, and community mentioned in a majority of the respondents.
-*Response highlight*- "Being able to thrive through our culture."

This question was designed to test whether the students had changed their views on what mattered to a healthy sustainable community - remember this is a proxy for resilience - based on what they learned in the workshop. There is overlap between the "healthy" and "sustainable" aspects that stresses the relationship of communities to the natural world, but the only other specific "health" idea is tied to reducing, or abstaining from, drinking and drug use.

Table 19 Healthy and Sustainable Community Descriptors Post-Workshop Responses

Post-workshop Responses
Nature or natural- 6
Subsistence/foods-6
Helping/sharing/cooperation- 4
Peaceful/calm/quiet- 3
No/low alcohol/drugs- 3
Beautiful- 3
Freedom-2
Welcoming-1
Iñupiaq values mentioned across many students' responses.

The scope of the post-workshop responses around what sustains a healthy sustainable community is more specific and value-driven. Students may have been growing more aware of the resilient strategies already at hand in their communities by talking about adaptation in a different future. Another important aspect we wanted to compare was how resilient students felt their communities were prior to the workshop, and afterwards. We asked students to respond to these type of questions based upon on a five-number Likert scale. I utilized median to determine the general tendency in responses, and only used averages to rank the responses in relation to one another (Bishop & Herron, 2015; Jamieson, 2004). This system of analysis and interpretation applies to all of the following Likert scale questions.

For the following statements, please think of the community (town, city, village) you live in, and select the answer that best reflects your opinion:

(A) My community is prepared to face future economic and environmental challenges.

(B) My community is prepared to prosper even in turbulent times.

Table 20 Likert Scale for Community Preparedness Question

1	Not true
2	Somewhat untrue
3	Neutral
4	Somewhat true
5	Very True

Students overall felt that their communities are somewhat prepared to face future and environmental challenges, females slightly more so than males. Students were neutral on whether or not their communities are prepared to prosper even in turbulent times, and there was an obvious difference in village residents versus Kotzebue (hub) residents. In the pre-workshop survey, students who reside in villages responded with a median score of 3 and average of 3.2; whereas students who resided in Kotzebue had a median score of 4 with an average score of 3.5. In the post-workshop survey, there was slight movement up the scale toward "somewhat true" on community preparedness based on average score. The median score moved from neutral to "somewhat true" overall for preparedness in turbulent times, which demonstrates that the workshop changed students' assessments about their communities' capacities to be resilient in challenging circumstances.

To gain a sense of how they rated their individual expertise, we asked students: **How much would you say you know about the following subjects in the Northern Alaska region?**

Table 21 Likert Scale for Prior Knowledge Question

1	I know a few facts
2	I have a good understanding
3	I know more than most people
4	I am an expert in this field

Students overall felt they had a good understanding of subsistence policies, changes in the natural environment (water and land), justice (policing and courts), emergency services (search & rescue and fire), non-emergency health services, education, and the concerns of 16-25 year-olds. Students felt that they knew a few facts about public facilities and services (non-emergency).

Table 22 Prior Knowledge Question Survey Responses Pre & Post

Pre-WS survey ranking based on average	Post-WS survey ranking based on average
1. Education- 2.61	1. Education- 2.38
2. Subsistence policies- 2.21	2. Changes in the natural environ- 2.10
Changes in natural environment- 2.21	3. Emergency services- 1.95
4. Concerns of young people- 2.16	Concerns of young people- 1.95
5. Health services- 2.05	5. Subsistence policies- 1.90
6. Emergency services- 2	6. Health services- 1.75
7. Public facilities- 1.74	7. Justice- 1.67
8. Justice- 1.63	8. Public facilities- 1.57

Students felt they gained knowledge about education over the course of the workshop, as their median score was 3, "I have a good understanding," up from 2, even though the average of the scores declined. This was the inverse of what I had expected, but maybe not so indecipherable. As the students were exposed to the deep need for knowledge around certain topics, it might have made them feel insecure about the knowledge they did hold. This would never be my intention, but still an interesting effect from the students' self-assessment of their knowledge bases.

The two selections of the Likert scale, "I know more than most people" and "I am an expert in this subject," were only used 24 times out of 168 response possibilities. In redesigning this survey for future use, I would use descriptors for 3 and 4 that seemed less boastful in tone. This may have affected student response. I was especially surprised that students did not rate their knowledge of the concerns of young people as higher. If they do not know the concerns of young people, then who does? This is an inventory of possible knowledge gaps that public schooling might do a better job in bridging.

How young people themselves view the different types of education they might receive was an area of study, via the question: **How important do you think these types of education will be in affecting the future of Northern Alaska?**

Table 23 Education Importance Question Likert Scale

1	Unimportant
2	Somewhat unimportant
3	Neutral
4	Somewhat Important
5	Very Important

Interestingly, based on the median score students felt traditional knowledge education and graduate degrees would be very important to the future of Northern Alaska, while K-12 schooling, some college education, vocational training and college degree all scored as somewhat important based on the median score of the student participants. Based on averages, here is how their Likert score responses reflected importance of the various forms and levels of education:

Table 24 Education Importance Responses

Pre-workshop survey	Post-workshop Survey
1. Traditional knowledge education- 4.81	1. Traditional knowledge education- 4.79
2. Graduate degree- 4.29	2. Graduate degree- 4.53
Some college education- 4.29	3. K-12 schooling- 4.47
K-12 schooling- 4.29	4. Some college education- 4.37
5. College degree- 4.24	5. College degree- 4.26
6. Vocational training- 4.14	Vocational training- 4.26

All forms of education from Traditional Knowledge to schooling knowledge were highly valued by the student participants of the Arctic Futures Makers scenarios development workshop. In all responses, there was one score of 2 and the rest were all 3 and above. I wonder when the education system will fulfill expectations in the same ways the students value their

various forms of education. These data also illuminate an opportunity to assert the vital importance of vocational education. It would not be much of a stretch to reframe the vocational education conversation via a resilience or sustainability lens to further amplify its appeal, because it is absolutely necessary, especially considering the need for maintenance of alternative energy sources like Kotzebue's wind farm.

When you think about the future what do you think are the FIVE things that pose the greatest *risk* to healthy, sustainable communities in Northern Alaska?

Table 25 Greatest Risks to Communities Responses

Weather/erosion/climate change-15
Loss or lack of values-13
Alcohol/homebrew/drunks/drugs-12
Pollution/oil spill/fossil fuels burning- 9
Education-4
Others mentioned: Unhealthy foods, restrictions on our guns, not taking action, living somewhere else, and overhunting/poaching.

There were valuable insights; many of these changes have the potential to destabilize not only the region but the global or social order at large. How do we as Alaskans prepare, and how do they, as rural Indigenous Alaskans, prepare for some of these possible perturbations to the system?

We were curious as to what extent Iñupiaq traditional values had been absorbed and/or practiced by these students. We asked them where they had heard about traditional values, then listed 17 Iñupiaq values (Table 26) and asked: **Which five of these will be the most important to a future of Healthy Sustainable Communities?**

The 17 Iñupiaq values were listed on the survey in this way:

Table 26 Iñupiaq Values

Knowledge of Language	Humility
Knowledge of Family Tree	Humor
Cooperation	Respect for Elders
Family Roles	Spirituality
Respect for Others	Responsibility to Tribe
Sharing	Hunter Success
Domestic Skills	Avoid Conflict
Respect for Elders	Love for Children
Hard Work	

Hard work, sharing and respect for nature were cited unanimously. Humility was rated the lowest at 17 out of 21 students deeming it important. All others scored in the 18-20 range out of 21 total respondents for values that participants had heard talked about or read about. Although co-production of knowledge was key to the outcomes of the workshop, the data shows there were not many changes in the Iñupiaq values they had heard or talked about over the course of the two days.

Students were then asked to evaluate which five of these values will be most important to a future of healthy sustainable communities.

Table 27 Five Most Important Iñupiaq Values to Healthy Sustainable Communities

Whole group results: Top 5	**Village Students: Top 5**	**Kotzebue Students: Top 5**
1. Respect for nature-14/21	1. Respect for others- 7/10	1. Respect for nature- 9/11
Respect for others-14/21	Hard work- 7/10	2. Respect for others- 7/11
3. Cooperation- 13/21	3. Cooperation- 6/10	Cooperation- 7/11
Hard work 13/21	4. Respect for nature- 5/10	Avoid conflict- 7/11
5. Avoid conflict- 10/21	5. Respect for elders 4/10 Knowledge of language4/10 Sharing- 4/10	5. Hard work- 6/11

Table 28 Five Most Important Iñupiaq Values Female and Male Subgroups

Whole group results: Top 5	Female Students Top 5	Male Students Top 5
1. Respect for nature-14/21	1. Hard work- 11/11	1. Respect for nature- 6/7
Respect for others-14/21	2. Respect for others- 9/11	2. Respect for others- 5/7
3. Cooperation- 13/21	3. Respect for nature- 8/11	Cooperation- 5/7
Hard work- 13/21	Cooperation- 8/11	Knowledge ofLanguage5/7
5. Avoid conflict- 10/21	Avoid conflict- 8/11	5. Respect for Elders- 3/7

The values of 1) Respect for nature, 2) Respect for others, 3) Cooperation, 4) Hard work, and 5) Avoid conflict resonate through the subgroup data as leading indicators of the values the students judged most valuable in building healthy sustainable communities. Females unanimously identified *hard work* as important. Males chose *respect for nature* as their top value. The hard work of domestic duties, child care and harvest management and support in relation to males' nature pursuits suggest a traditional framework of family structure that may soon grow more flexible as gender roles are redefined with time and female outmigration.

The interesting outlier is male village students and their valuing of knowledge of language and respect for elders. We must acknowledge the small sample size here, but the potential for schooling in villages to facilitate these male students' values is a hugely important opportunity for growth and development. Further research will need to encompass evaluations of knowledge, learning, and life experiences of village students to better understand the "protective factor" standing of language and elders among males.

To help design strategies to contact students and connect them to one another and to resources, we asked them: **When you communicate your thoughts and ideas about your life and community which communication tools you regularly use?**

Table 29 Preferred Communication Tools

Telephone- 10 of 21	E-mail- 1 of 21 students	(Snail) mail- 0
Texting 12	Twitter- 0	LinkedIn- 0
Facebook 9	Instagram- 7	YouTube- 3
Pinterest- 1	Google+ 0	Blogs- 0
General webpages-0	Radio- 2	Face to Face talking 8

The data demonstrated a mild preference among female respondents for Instagram over male respondents in the data, but otherwise the data amongst subgroups reflects the preferences of the group at large. This data will almost certainly change once Kotzebue and potentially some village communities gain access to broadband Internet in the next few years via the Quintillion project. This also identifies yet another reason why it is vitally important that UAF maintain the capacities of the UAF Chukchi campus during increased budget cuts: once the virtual landscape changes with the addition of broadband, Kotzebue will require a vibrant, well-staffed, and well-networked educational institution to capitalize on human capital via education and training. These communication methods are also important to keep in mind when thinking about future community sustainability and health, as communication is vital in cases when community must come together to respond, harvest, help and adapt. Telephone elucidates the age difference between researchers and survey developers and the reality of Arctic Alaska's youth: most of the students had mobile phones and the numbers of landlines dwindles each year.

We also asked multiple questions about the importance of K-12 education, Traditional Knowledge, and futures thinking:

-How important is formal education (K-12 and beyond) to the future *you are pursuing?*

-How do you view the importance of formal (K-12 and beyond) education *for the future of the region?*

-How important is traditional knowledge education, learning skills outside of schools at home or on the land or water, to the future *you are pursuing*?

-Do you think *thinking into the future*, 10 or 20 years from now, is helpful to how you learn?

Table 30 Forms of Knowledge Importance

Forms of Knowledge	Pre-WS response averages	Post-WS response averages
Traditional knowledge education	4.86	4.63
K-12 and K-20 education is important for the future of the region.	4.62	4.37
K-12 and K-20 education is important to the future these students are pursuing.	4.57	4.47
Thinking into the future, 10 to 20 years from now is importantly helpful to how these students learn	4.57	4.68

Students acknowledge the importance of various forms of education to their own future and that of the region. The median score for all four questions was 5 and the average score for each above 4.5. In the post-workshop survey the median scores remained the same, although average scores dipped slightly for each category of education or thinking, except for futures thinking's importance to the region, which increased slightly.

Role of formal education in students' futures- Post WS Survey

We asked students: **when you think about your future, 15 or 25 years from now, what role do you see formal education (K-12, junior or community college, the university) playing in your futures?**

Table 31 Role of Formal Education in Communities' Futures

It will play a big part of my future. I plan to be a psychiatrist, which pretty much means I am going to be learning for the rest of my life.
I want to be an elementary teacher.
Kindergarten would be learning how to read. First grade would be adding & subtracting. Second would be multiplying & dividing. Third doing essays, cursive writing Fourth presentations stepping up. Fifth grade getting ready for high school. Sixth doing required credits until 9th grade 10 through 12 college credits to be ready
More education to continue learning about our futures. Going to need a lot more education/training for jobs in the future.
I see myself being successful and having a great job and college will help me get there.
Get to do stuff I didn't do before; Also I get to learn stuff I didn't learn yet.
It will help me see things different.
It helps me reach my goal as a welder or anything else I want to be.
I see people trying their best to achieve their goals to support their families.
I see them getting more education & being more challenged.
I see formal education as an important place.

Here the importance of education continues to reverberate through students' responses about the future.

The next set of questions was tied to personal resilience, or what are called "protective factors" by educational literature on resilience in young people. These results should be taken as guideposts for how we might utilize school policies and practices, as well as community support, to enhance the resilience of rural Indigenous Alaskan high school students. These questions were all open-ended in order to test whether the students understood what we were asking. For future surveys we may be able to create a more comparable set of closed questions.

Sometimes when we work very hard to achieve a goal we encounter roadblocks. Events or people may prevent us from reaching our goal. When this happens we can adapt to change our strategy to meet this goal or we can give up on the goal. When we adapt we do not want

to give up what makes us who we are, for example our cultural beliefs, our family values, or our ethics. *Resilient* is the word used to describe those people, or communities, who are able to adapt and make changes to meet their goals over time and not give up too many of their core principles.

a. Think of a time that you tried to reach a goal and faced obstacles, what helped you most to have the courage to keep trying?

Some highlights/strategies/protective factors students have identified that assist them in being resilient:

Table 32 Individual Resilience Factors More Frequently Mentioned

Self-talk, self-preservation, self-belief, persistence, determination
Family, parents
Elders
Teacher
Friends
Sports- Basketball, teammates, wrestling, coach

Table 33 Individual Resilience Factors Less Frequently Mentioned

Less frequently mentioned
Music
Exercise
Other people, meeting new people
Motivated to finish
Reward
Faith in God
Thoughts of failure or quitting
Commercial fishing

These students have a keen understanding of strategies for resilience in the face of challenge or potential failure. The key to fostering these resilience behaviors is finding the bridge or the transfer of these strategies and qualities to further their pursuits of being Iñupiaq, of happiness, of success, and of resilience for the community at large. Some school practices can foster these behaviors while others cannot.

b. When you think of giving advice to a friend who might be struggling to reach a goal and facing obstacles what advice do you usually give?

Table 34 Advice for Overcoming Obstacles Open-ended Responses

-It always rains before the rainbow.
-Do things one at a time
-Tell them not to give up and keep it up
-That they can keep going, that they are strong enough to overcome anything
-Life will have ups and downs but we still have to keep going.
-Try your best. Never give up.
-I would tell them to keep pushing themselves to reach their goal and that they would meet many challenging obstacles in life.
-I tell them not to give up.
-Just keep putting in the work for your goal. Why quit? Your already this far, might as well just keep going.
-You ain't got anything better to do and if you do it ain't as fun
-I tell them what they have to do to reach their goal and leave it up to them to achieve this goal.
-I tell them not to be afraid to ask others for help because they might not be able to do it alone.
-Well I'd tell him/her to think back on why they started this goal?
-To keep trying the thing about failing is that you learn from them and you will get to your goal.
-Just keep trying till you succeed.
-I tell them to keep going if that's what they really want.
-I tell them they can do it and that when they try they know it will be worth it all when they have reached their goal. I try and stay positive and give them the best advice they need to accomplish their goal.
-Keep going
-Tell them to just keep on pushing
-That they are strong and they **have gone this far**. They can do it.
When I give advice to a friend I tell them to stay determined, & stay positive.

c. If you wanted very much to achieve a goal but knew that you would have to adapt, to change your strategy for reaching it, what would you LEAST want to change about yourself, your principles, or your life?

Table 35 Adaptation Non-negotiable Life Aspects Responses

Being patient
I would change my life so that I will have a better future
I wouldn't want to become or act like somebody that I'm not. I wouldn't want to act in any way that would change my views of life for the worse.
Change my attitude
The thing I would change about myself is being too shy around people I don't know.
I wouldn't mind changing, if I wanted to achieve a goal, I would do it.
Behavior issues to stop using profanity words to others, get up earlier in the morning
I would not want to change my faith in God unless it's to strengthen my faith.
The least thing I would want to change would be my life.
My principles. Sometimes, change is good in life and you can't be afraid to change for the better.
My subsistence lifestyle
My life
I probably wouldn't change anything about myself.
Where I live
The way I work and the strategies I use.
How hard I work, stay positive, working with others
My determination

The students seemed to struggle with this question. We were curious about specifics such as cultural identity, gender, or where they lived. Instead the students focused on the affective qualities with which they most often associate. This question would have to be re-written in order to elicit responses that focus on students' core identity attributes.

Moving in a different direction, we wanted to know what sort of external resources were important to the students' resilience. We designed a closed-ended survey asking: **In these examples below identify from whom you might draw strength to make a decision. For each one, pick only the top three you rely on the most.** The results below are expressed in the order of the students' ranking. The top-ranked external resource for each type of decision-making has two numbers, i.e. 19/21 means 19 students out of 21 total chose this response.

Table 36 Response Key for Advisers Question

Friends	Friends
Family	Family members
School	School teachers or administrators or counselors
Elders & Culture	Alaska Native Elders or Culture
My own	My own ethics – I usually work out my decisions by myself
Counselor	A counselor or therapist not affiliated with my school
Religion	Religion and religious leaders

Table 37 Responses to Advisers Survey Question

When I am facing a difficult personal decision about healthy behavior
1. Family- 19 of 21 (19/21) total students identified this choice
2. On my own- 11
3. Friends- 11
4. School- 3
5. Elders & Culture- 2
6. Religion- 2
7. Counselors- 0
When I am facing a difficult decision about my education in school
1. School- 17/21
2. Family- 12
3. My own- 9
4. Friends- 6
5. Elders & Culture- 2
6. Religion- 1
7. Counselor-1
When I am facing a decision about my cultural heritage
1. Elders & Culture-15/21
2. Family- 14
3. My own- 6
4. Religion- 5
5. Friends-3
6. School- 1
7. Counselor-0
When I think about my future and its possibilities
1. Family- 16/21
2. My own- 12
3. School- 8
4. Friends- 7
5. Elders & Culture- 3
6. Religion- 1
7. Counselor-1
When my friends or family members are struggling and ask my advice.
1. Family- 11/21
2. Friends- 11/21
3. My own- 10
4. Elders & Culture- 6
5. School- 4
6. Religion- 3
7. Counselor- 2
Total overall when ranking sources of decision strength overall
1. Family- 72
2. On my own- 48
3. Friends- 38
4. School Personnel -32
5. Elders and culture- 28
6. Religion- 12
7. Counselor- 4

Obviously family is a source of strength for these students overall. They also seem comfortable making decisions for themselves as they develop from youth into adults. Friends, school staff and elders round out the middle band of strength providers, and religions and counselors provide support on the periphery. I would like to know more about the potential of social workers or the possibility of itinerant Alaska Native counselors or Elders visiting villages. This looks like an area for possibilities and potential improvement along the resilience continuum.

Finally, students were asked: **Within your circle of friends, how often do you discuss issues related to community health and sustainability?**

Table 38 Responses to Frequency of Discussions of Community Health and Sustainability

Very often- 0 students
Quite often- 4
Sometimes- 5
Rarely- 7
Never-1

6.9.2 Data Specific to Workshop Functioning: Role of Deliberation - Survey results specific to the Post-Workshop survey

Several questions related to the workshop experience were only asked in the post- survey. These two sets of questions were tied to the framework from Andersen and Hansen (2007), informed by decades of deliberative democracy literature (Ryfe, 2005). We surveyed participants on four dimensions: political tolerance, mutual understanding of opinions, quality of deliberation, and political efficacy.

Table 39 Likert Scale for Workshop Specific Questions

5	Strongly agree
4	Agree
3	Neutral
2	Disagree
1	Strongly disagree

Consensus: Overall students agreed (median 4, average 4.1) that from the beginning there was consensus in our workshop about the meaning of healthy sustainable communities. Students also agreed (4, 4.26) that towards the end there was consensus in our workshop about the meaning of healthy sustainable communities. Students agreed (4, 3.89) that there was often consensus on the subjects discussed in small working groups. Students were neutral on average (3, 3) when asked whether it was difficult to *agree* on any of the subjects discussed in small working groups. Scores on this question ranged widely from 1-5 with multiple respondents at the ends of the range of responses.

Discussions: Students agreed (4, 3.53) that a few participants dominated the discussions. Students agreed (4, 3.53) that alliances arose between some of the participants. Students were neutral (3, 3.42) about whether the discussions in the small working groups were superficial. Students disagreed (2, 2.74) that there was too little time to discuss. Students agreed (4, 4) that all aspects of healthy sustainable communities were covered in the small groups or during the workshop. Students felt the workshop was comprehensive about healthy and sustainable communities.

Mutual understanding of opinions: Students agreed (4, 3.84) that the discussions were characterized by responsiveness towards each other's arguments. Students agreed (4, 3.79) that each of them individually developed an understanding of positions that were opposite their own. Students agreed (4, 4) that all positions in the group were considered with equal respect. Students

agreed (4, 3.74) that the arguments of the other participants were useful in forming their own position.

Political tolerance: Students agreed (4, 3.68) that lack of knowledge is the reason why other people have plans or visions of the future of the region that are different from mine. Students agreed (4, 4) that other citizens have good arguments for supporting plans or visions of the future of the region different from their own.

Political efficacy: Students then evaluated their input into the political, policy and decision-making processes in various scales of government. Students were neutral (3, 2.89) when evaluating the statement "citizens like myself have no say in decisions made by state and national government." Students were neutral (3, 2.84) when thinking about the statement, "citizens like myself have no say in decisions made by the borough." Students were again neutral (3, 3.37) when considering whether citizens like themselves are qualified to participate in the debates over U.S. Arctic Policy. However, in general, students agreed (4, 4) that citizens like themselves have viewpoints that are worth taking into consideration.

Students were also asked to assess how well-informed they were around policy.

Table 40 Likert Scale for Policy Awareness

1	Not very well
2	Somewhat well
3	Very well

Students felt somewhat well-informed (2, 2.11) about borough policies tied to community health and sustainability. Students felt somewhat well informed (2, 2) about Alaska state policies tied to Arctic policy. Students felt somewhat well informed (2, 1.89) about the U.S. role in the Arctic Council.

And finally, students were asked if they had any other comments or thoughts they would like to share that would help us work with students in the future.

Table 41 Other Open-ended Comments or Thoughts from Youth

Just be honest about what the topic of discussion is. Let us know why it is important, and try to make it interesting to the age group you are presenting to. Thanks…
The program helps you understand what can happen in the future if you don't take care of the land or our cultures. It helps to look at another way of living in our community. I liked some things about it & disliked some others.
What I learned here I'd like to take back and tell the people of my community.
I had fun.
You guys have opened up a different view into the future that I didn't think of, but this view shows how uncertain things are in the future of our region, and our generation is going to experience it.
More open work place.
You guys did a good job with this workshop. I enjoyed being able to be a part of it.:)
I really enjoyed the past two days. Like you said the second day, I feel some people in the groups didn't put in equal effort.

6.10 Discussion

In the AFM workshop as well as in my classroom experience with problem-solving, critical-thinking based curricula, the perspectives and thoughtfulness shine when given the opportunity to exercise these skills. Students thrive when asked to work through complex problems like the challenging focal question of the workshop. Scholars like Lebel (2006) and Pahl-Wostl and Hare (2004) have identified key aspects of social learning processes that are rooted in deliberation and assist in building adaptive capacity amongst social groups. Scenarios development workshops are such deliberative and social learning activities. In the table below I match the outcomes of social learning with activities that took place during Arctic Futures Makers.

Social Learning: Lebel's application to the AFM scenarios workshop.

Table 42 Scenarios Development Workshops as Social Learning Exercises

Outcomes of Social Learning (Lebel, 2006)	How Scenarios Development Workshop Applies
1. Cope with informational uncertainty	We gathered the best information, research and data currently available and then made best guesses from the information at hand to bridge informational uncertainty.
2. Reduce normative uncertainty	Norms from family to family and classroom to classroom can often differ, much like the varied fields participating in community scenarios development exercises. Having skilled facilitation and space to make mistakes helped to reduce normative uncertainty in the scenarios development process and unpack some of the norms around research, knowledge, policy, and deliberation.
3. Help to build consensus on criteria for monitoring and evaluation	Once students identified key drivers and factors they generated many indicators for monitoring. Students' prioritization and combinations of multi-factor indicators engaged them in evaluating importance and feedback from the monitoring of those indicators.
4. Empower stakeholders to influence adaptation and take action by sharing knowledge and responsibility in participation.	As the workshop progressed, students began to ask how they might impact decision-making processes locally or on a borough level. They also spoke about informal monitoring they had been doing across seasons on certain indicators and variables (i.e. especially around hunting or harvesting).
5. Reduce conflicts and identify synergies between adaptation activities	Students came from across the borough and discovered their observations of weather-related events indicated they were occurring across the borough. When students spoke of these they shared a variety of adaptation and mitigation strategies, both successes and failures.
6. By addressing the concerns of all relevant stakeholders, social learning improves the likely fairness of decisions and actions. Deliberative processes bring together alternative perspectives and forms of knowledge reducing the likelihood that collective responses are based solely on relative influence and power of the actors involved	Bringing students from the smaller villages was key to broadening the scope of this project. Seeing the challenges from hub community perspectives as well as village perspectives allowed students to incorporate knowledge and input across a variety of experiences and from Indigenous and Western knowledge perspectives.

Figure 32 Arctic Futures Makers 2016

6.11 Conclusion

Students proved to be less imaginative than expected. Youth and their wild imaginations was what I hypothesized entering the AFM project. While students certainly showed innovation in their thinking about futures, they were logical and rational when allowing their imagination entertain futures, even a bit hesitant at times to speculate "outside the box". They needed considerable time to explore the idea of being able to imagine different futures, unlike the adults who quickly understood they were being asked to imagine. This may be due to over a decade of standardized testing and imposition of a system of schooling that can be at odds with local cultural traditions. While beyond the scope of this study and difficult to measure, has standardized education limited students' capacities to critically think, imagine, and step outside

the norms? The students' key factors were remarkably similar to those of the adults. There was correlation between the lists of the adult opinion leaders from the NASProject participants and the AFM project students' key factors. Students' key factors demonstrated a more fine-grained connection to those factors, an optimism, a solution-oriented approach in contrast with the adults' business-like terminology, reality of context, and more problem-oriented summation in considering what would most impact healthy sustainable communities of their region. This makes sense given the null hypothesis proven in H5. It could also be accounted for by the strong respect for one's Elders' opinions in the region.

Even though student-participants came from across the NWAB, hailing from the hub community, Kotzebue and the villages, there were patterns of resilience particular to experience, access to resources, and protective factors. Work, land, community, family, moving, education, snow, making and the environment were all recurring themes when students drew upon what makes them and their communities resilient in times of difficulty.

Chapter 7 Conclusions and Futures

7.1 Introduction

The purpose of this study was to understand the role public education systems play in rural Arctic Alaska's community resilience. This was approached from three differing points of view: from the perspective as the school as a form of governance, from the perspective of community members, and from the perspective of the students themselves. I explored the role of public schooling via a literature review and by placing the current public school system of Alaska in a historic context. I used one-on-one interviews in two rural villages of the NSB to better understand the communities' expectations for schooling, along with surveys and participant observation during the NASP. Lastly, I employed a scenarios development workshop to learn how students perceived their resilience, their futures, and how informal and formal modes of education impact both.

7.2 Strengths and Limitations

The strengths of this study are its multidisciplinary approach to unraveling the complex nature of community resilience and the educations systems that impact it in rural Alaska. My mixed-methods approach enabled multi-modal analysis of the important aspects of the system as well as of the complex nature of what it means to be Indigenous and rurally educated. Although the sample sizes are small, because of the qualitative nature and mixed methods the depth of knowledge generated meaningful input to the research questions and feedback on the hypotheses. The small sample sizes may limit generalizability. While I believe some of my conclusions are applicable to other contexts, it will take further research to confirm just which findings can assist

in informing schooling elsewhere. The brief nature of the relationships between myself and the workshop participants is also a limitation, but might be better addressed in the future; as I continue to work in the education field of Alaska and build my futures network, I anticipate people will feel more comfortable to address difficult questions about the future. I felt this drawback most acutely when working with the students during AFM. Having some other opportunity to build common ground with the students would help in getting over that initial anxiety of the first day. Face-to-face interactions are the lingua franca of rural Alaska connectivity and research.

7.3 Discussion

Education fosters resilience. Compulsory education is a tool that can enhance resilience. In the workshop process of NASP the 21 key factors that participants identified as vital to community health and sustainability in 2040 (my proxy for resilience) clustered into (in no particular order): 1) fate control, 2) culture, 3) education, 4) economics, and 5) well-being. Please note that these key factors and the discussion of clusters were ground-truthed with the same Arctic resident experts (and some new ones) who joined us for subsequent workshop. Here are the two clusters of fate control and education.

Table 43 Key Factor Clusters around Fate Control and Education

Clusters around fate control	*Clusters around education*
Land management and ownership	Interaction of levels of government
Subsistence security	Intersectional engagement
Regulatory process	Access to education
Interaction of levels of government	Preparation of teachers and school administrators
Pan-Arctic collaboration	Transmission and recognition of traditional knowledge
Tribal governance	Inupiaq values
Local determination	Language proficiency

The Arctic Social Indicators 2 Implementation (ASI2, 2014) work combines the United Nations Human Development Initiative and the Arctic Human Development Report from 2004 to pinpoint six key elements for human well-being, listed below. Our work has tested theirs and they are highly similar, but I want to focus on number six.

1. Health and population
2. Material wellbeing
3. Education
4. Cultural wellbeing
5. Contact with nature
6. *Fate control: 4 "Sub-Domains" below*

a. [Political power/human rights] The percentage of indigenous members in governing bodies (municipal, community, regional) relative to the percentage of indigenous people in the total population
b. [Decision-making power/human rights] The percentage of surface lands legally controlled by the inhabitants through public governments, Native organizations and communities.
c. [Economic control] The percentage of public expenses within the region (regional government, municipal taxes, community sales taxes) raised locally
d. [Knowledge construction/human rights] The percentage of individuals who speak a mother tongues (whether Native or not) in relation to the percentage of individuals reporting corresponding ethnicity

Similar to our clusters in NASP, the report separates education and fate control. But in fact they are tightly tied together, as I explain below using Brayboy (2005). If one considers each of the ASI2 subdomains of fate control, it becomes clear that education is intimately linked to fate control. What does this mean? The significance of point (a) is that, because school boards are governing bodies in the U.S. compulsory education system, we see that political power matters. Point (b) matters at least indirectly due to how students may learn not only in the classroom but also out on the landscape, even if studying Western concepts tied to hydrology, biology, ecology, and other components of standardized knowledge. Point (c) is significant in Alaska because school funding rests in the hands of the state Legislature matters. And (d) is clearly linked to the ability of Indigenous peoples to transfer knowledge embedded in language and culture to youth.

It should be noted that ASI2 doesn't equate fate control with Indigenous self-determination from a sovereignty standpoint. But it does broadly capture the need for Indigenous peoples to be able to determine how schools educate young people.

Resident Arctic experts concerned with community health and sustainability already find great value in the role of education. Education is the basis for learning how to be a productive, but also personally satisfied, adult. For Indigenous peoples this education takes place on the land, on the water, in the home, and in the school, but in the end it takes all of these places and methods of learning to create the whole person capable of contributing to community health and sustainability.

There are some potential initial steps and short-term goals to begin the process of educational reform: 1) Communities and parents must engage in dialogue and action in regards to a school's purpose and curriculum, possibly via methods like critical inquiry and action research. 2) Even before these steps, parents must be educated in the concepts and vocabulary around modern schooling and education, including subjects like standards, accountability, assessment, and the feasibility of real school improvement processes and measures. 3) Parents can be viable producers, gatherers, and analyzers of data that demonstrate how a school is fulfilling or not fulfilling objectives and goals set by a community based on local contexts. If elders and a community are to change an educational program to better values Indigenous knowledge(s), they first require knowledge of the mode of discourse and structural underpinnings of the current system. The input of elders of the community is a valuable and vital link to culture, values, history, family, tradition, and the future.

High school students consider education to be important for the future of their community. This student from the Arctic Future Makers workshop puts it best: "You guys have

opened up a different view into the future that I didn't think of, but this view shows how uncertain things are in the future of our region. And our generation is going to experience it." If education is not in the business of opening minds and exposing students to different viewpoints and strategies for making meaning, than education should be in a different business. How often does our education system engage students in the pursuit of navigating their own lives to maximize their own and their community's resilience? It is not until we fully know ourselves that we might fully understand our world. A youth separated from the history, culture, and identity of their people is a youth who does not know their roots; and without the roots, there is nothing from which the tree can feed. The learning tree fails.

Education, broadly considered as social learning, is directly connected to Arctic resilience at the community scale. The promise of Arctic youth to actively shape the future remains an untapped resource in the pursuit of community resilience. Social learning processes such as scenarios development are potentially important for building adaptive capacity, along with other deliberative processes that ask students to engage in the rigorous thinking required for analysis of complex systems. Indigenous forebears have been engaging in this similar kind of thinking and analysis for millennia.

7.4 Recommendations

1. Schools must teach both Indigenous Knowledge and Western education
2. Schools must be flexible to allow time spent observing outside and acquiring skills related to rural and Indigenous livelihoods.
3. Schools must address turnover through stronger programs that matter to local residents so that they return to teach and administrate. School systems must address accountability to

standards set at state and local level through more comprehensive and systematic school assessment measures, i.e. school portfolios, school climate surveys, etc. School systems must practice transparency and open lines of communication between school personnel and parents and community members, between teachers and students, and within the school itself.

4. Resilient learners make resilient schools, and these feed into community resilience by ensuring that well-educated young people can be successful in their lifepaths and thus become community leaders.

7.5 Futures Research

This work has the potential to spin off in numerous directions. At every point when I expected to generate more answers, I only found myself faced with more and more questions. I would like to continue to use scenarios development workshops with youth from other regions, to assist others in thinking about the future, to compare results, and to improve upon the process. It could be done much better in the future. This also has potential as a form of outreach to bring the University of Alaska Fairbanks out to hub communities and villages. The University can serve as impartial broker of information and facilitator of social leaning processes.

7.6 Conclusions

Compulsory education creates a system of governance of minors in which they are enculturated into ways of knowing about their social-ecological systems. Residents of Arctic Alaska value this formal education because it offers youth opportunities to gain skills for economic success. Youth also view their formal education as important to their personal success. Indigenous knowledge, and its consequent education, is also highly valued and I discuss it in

terms of livelihoods for those youth choosing to stay in remote rural communities and/or to participate actively in Iñupiaq cultural pathways. Education must thus be encouraged in two modes and be governed through techniques that foster both modes actively in students' lives. Otherwise, the negative outcomes of schooling—those that divide community members from one another and from their culture—will be repeated in an underrepresented culture. Community resilience is directly connected to social learning, but this learning, in order to create livelihoods for young people, must be tied to the social-ecological system, respecting Iñupiaq language and culture alongside Western science and values. Without Indigenous and non-Indigenous people acquiring Indigenous knowledge about Arctic Alaska, there will be no observational expertise of change to continue adaptation.

As a society we can no longer deny alternate ways of knowing to minority cultures. Students' identity development is being thwarted by a narrow and singular focus on assessment performance. Education and learning should be multi-faceted and provide a broad spectrum of access to possibilities for the enfranchisement of Indigenous students. The divide between the learning inside of school and the lives of Indigenous students outside of it requires that we as educators and as a society find the bridge between the two to enhance individual, community and global resilience.

If we do not push the education system into relevancy and a consideration of the future for Indigenous students, then communities, lifeways, and languages will become extinct. These two ways of knowing must be taught simultaneously, to everyone. If we do not foster adaptability and a willingness to learn new skills, then what do we do with our aging populations, especially men who seem to be less adaptable and less willing to take on a new career or path?

Because of their small scale and their adaptive worldviews, place-based Indigenous learning institutions have the potential to address humanity's largest, most essential questions. In the end it may be that they are teaching the rest of the world how to redefine selfhood and identity and to grapple with multiple knowledge systems in a rapidly changing world. In an ideal world, one in which culturally-driven learning institutions are free to wrestle with the questions of what it means to be human, to be Indigenous, and to live in a social-environmental system undergoing raplex change, there is distinct hope for both human and ecological resilience.

Figure 33 Alaska, North to the Future, photo by Douglas Cost

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Appendix 1 Interview Questions for Administrators/Teachers around Current School Programing and Future Alternative School Programming

-Goal of survey/elevator speech/purpose 3-5 minutes

"My name is Doug Cost, I have been asked to talk with you by the North Slope Borough School District about your teaching (or administrative) experience in _____School. The purpose of this survey is to gather information about the goals, processes and outcomes of the current school system and its operations and assess whether alternatives could improve student motivation, participation, and graduation rates. Your answers will contribute to a better understanding of what _____School does and how _____School might do it better. You are not required to take this survey and you can choose to end the interview at any time. The answers you provide will be recorded in writing and be used to write a report on the value of alternative schools or programs in the North Slope Borough School District. The data will be collected and reviewed to develop a plan for alternative secondary school programming to support student success, proficiency, and graduation. Your name will not be assigned to the response, only your gender and grade level. There will be no record of the minors who participated in the survey except for the number of participants and their year in school, for example five seniors, three juniors, eight sophomores, and nine freshmen participated. I may use quotes from the students, but any quotes used in the report will not be attributable in any way to you, the other students, or even their grades in school. All the interviews will be kept secure by the North Slope Borough School District."

-Questions

1. Why do you think students come to school?

- Prompt them for more than one or two responses
- Ask them "which do you think is the most common reason?"

2. Why do you think students do not come to school?

- Prompt them for more than one or two responses
- Ask them "which do you think is the most common reason?"

3. What do you think the point of school is? I mean, what is it preparing you to do?

4. How do you think schools can best prepare students to have choices about their life when they graduate?

5. Why do students stop coming to school? What happens to them?

6. What are the plans of most students after graduation? Do you think that school has helped these students achieve these plans?

- Do you have any plans you'd like to share?
- (If they feel comfortable sharing their plans you can ask, "How can school help you achieve those plans?")

7. Do you think of your school as connected to community? Why or why not?

8. How might the school and teachers better support student learning so that all students graduate and become successful in their adult lives?

9. If you could redesign this school, what would it be like? For example does the school schedule work well for most students? How might you change it? Why?

10. What additional things would you like to share about the prospect of doing things alternatively/differently at _____ School to better support student motivation, success, graduation and proficiency?

Appendix 2 Interview Questions for Administrators/Teachers around Current School Programming and Future Alternative School Programming

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-Questions

1a. Name & position

1b. How long have you been working at this school?

- In the NSBSD?
- What capacities?

2. Does _____ School have any specific goals and what are they?

- If they say no or I don't know then "Is there a shared vision of what School X should be or do?"
- If they say yes or no to either then "What do you think the goals of your school should be?"

3. Thinking about the students who graduate from _____School, what do you think defines a successful graduate? For example, what would a successful graduate do after he or she graduates?

4. How would you assess the culture of the school? The school's cultures? (community, academic, social, cultural, economic, political, environmental)

5. How many of the students at your school are boys? Girls? What do you think the ratio is in the school?...in your classroom or classes?

6. When you think of an alternative school model what comes to mind?

- (After their response if they are uncertain) "In theory alternative school models are based in a foundation of finding and developing ways for schooling and learning to better fit students' needs. Do you think an alternative school model might work here? What do you think it would look like here?

- (If their response is accurate) Do you think an alternative school model might work here? What do you think it would look like here?

7. Would more students attend and be motivated to perform at an/the alternative school if given the choice?

8. When students who have dropped out or not succeeded at school here are asked why they dropped out or did not succeed what are their responses?

9. Do you consider this school adult centered or student centered? Why?

- If it's not as student-centered as it might be, how might it become more student-centered?
- Might there be resistance?

10. Do you think a different structure of the schooling at _____School could better support student-learning outcomes?

- If yes, how?
- If not, why not?

11. What have been some of the successes of _____ School?

- Shortcomings?

12. When you think about the successes, what do you think might be some strategies to continue or replicate these kinds of successes?

13. When you think about the shortcomings, how might some of these be overcome by doing things differently than they have been done in the past?

14. What would you suggest in going about determining appropriate alternatives to current school programming at _____School?

15. What additional things would you like to share about the prospect of doing things alternatively/differently at _____ School to better support student motivation, success, graduation and proficiency?

Point Hope-Tikigaq specific question because of its larger size when compared to Point Lay

Which do you think might be a better fit for Tikigaq a pullout alternative program or to just rethink the whole structure of the high school setting to serve students more effectively?

Appendix 3 Interview Questions for Parents/Community Members around Current School Programming and Future Alternative School Programming **Pl/PH Kali/Tikigaq**

-Goal of survey/elevator speech/purpose 3-5 minutes

"My name is Doug Cost, I have been asked to talk with you by the North Slope Borough School District about your experiences with _____School. The purpose of this survey is to gather information about the goals, processes and outcomes of the current school system and its operations and assess whether alternatives could improve student motivation, participation, and graduation rates. Your answers will contribute to a better understanding of what _____School does and how _____School might do it better. You are not required to take this survey and you can choose to end the interview at any time. The answers you provide will be recorded in writing and be used to write a report on the value of alternative schools or programs in the North Slope Borough School District. The data will be collected and reviewed to develop a plan for alternative secondary school programming to support student success, proficiency, and graduation. There will be a record of the people who participated in the survey but any quotes used in the report will not be directly attributed."

-Questions

1a. Name & involvement at school

1b. How long have you been involved in activities at _____ School?

- In what capacities?

2. Does _____ School have any specific goals and what are they?

- If they say no or I don't know then "Is there a shared vision of what School X should be or do?"
- If they say yes or no to either then "What do you think the goals of your school should be?"

3. Thinking about the students who graduate from _____School, what do you think defines a successful graduate? For example, what would a successful graduate do after he or she graduates?

4. How would you assess the culture of the school? The school's cultures? (community, academic, social, cultural, economic, political, environmental)

5. When you think of an alternative school model what comes to mind?

- (After their response if they are uncertain) "In theory alternative school models are based in a foundation of finding and developing ways for schooling and learning to better fit students' needs. Do you think an alternative school model might work here? What do you think it would look like here?

- (If their response is accurate) Do you think an alternative school model might work here? What do you think it would look like here?

6. Would more students attend and be motivated to perform at an/the alternative school if given the choice?

7. When students who have dropped out or not succeeded at school here are asked why they dropped out or did not succeed what are their responses?

8. Do you consider this school adult centered or student centered? Why?

- If it's not as student-centered as it might be, how might it become more students centered?
- Might there be resistance?

9. Do you think a different structure of the schooling at _____School could better support student-learning outcomes?

- If yes, how?
- If not, why not?

10. What have been some of the successes of _____ School?

- Shortcomings?

11. When you think about the successes, what do you think might be some strategies to continue or replicate these kinds of successes?

12. When you think about the shortcomings, how might some of these be overcome by doing things differently than they have been done in the past?

13. What would you suggest in going about determining appropriate alternatives to current school programming at _____School?

14. What additional things would you like to share about the prospect of doing things alternatively/differently at _____ School to better support student motivation, success, graduation and proficiency?

Point Hope-Tikigaq specific question because of its larger size when compared to Point Lay Which do you think might be a better fit for Tikigaq a pullout alternative program or to just rethink the whole structure of the high school setting to serve students more effectively?

Appendix 4 Arctic Futures Makers Flyer

NASP
Northern Alaska Scenarios Project

Future Makers - Scenarios with Northwest Arctic Students

Healthy Sustainable Communities in 2040

UAF Introductory course on Arctic Future Studies

Brought to you by NWAB Science Committee, UAF, Northern Alaska Scenarios Project (NASP), and NWABSD

The NASP team is working with the leadership and students of the Northwest Arctic Borough School District (NWABSD). We will be facilitating a scenarios development workshop with high school students of the NWABSD. We want your input on the future you want to have in Arctic Alaska. What do you think about, "What does my community need to be healthy and sustainable by 2040?" We are bringing together students from Kotzebue and the villages of the NWAB. The scenarios workshop will be February 23-24, 2016. The travel to Kotzebue, meals and housing are covered by a grant from NWAB Science Committee.

We want to learn from you, the students of the NWAB! Bring your experiences. Gather what you know to share with other students. Students will use what they are learning in school, at home, and in their free time. We will consider factors related to sustainability, climate change, language, the landscape and people of their region. Together we will explore what your home might be like two decades from now. The goal is to create a sense of connection between high school experiences and learning and "real world" decision-making (e.g., borough level planning, the Alaska Arctic Policy Commission).

The research goal is to understand the priorities of Arctic rural youth in relation to health and sustainability of their communities. Students are a group often overlooked. They are vital to maintain the cultural, economic, and social knowledge related to the future of their community's well being. The students' goal is to develop a sense of what they want for themselves and their communities in the future. How can they make plans to progress towards these targets for the future?

A scenario exercise is a process of asking "what if?" It enables students to imagine multiple possible futures. The scenarios workshop illuminates what matters most for a path to the future. Instead of reacting to whatever comes, scenarios help individuals and organizations shape the future of the NWAB.

EARN UNIVERSITY CREDIT

Questions? Do you want to learn and have fun? Do you know someone who should be involved? Please contact us!

Doug Cost - Project Coordinator - dscost@alaska.edu - 907.474.1556

Amy Lovecraft - Project Team Member- allovecraft@alaska.edu - 907.474.2688

UAF Office of Research Integrity - uaf-irb@alaska.edu - 866.876.7800

NORTH BY 2020

UAF UNIVERSITY OF ALASKA FAIRBANKS

ARCTIC FUTURE MAKERS

"Creating healthy, sustainable communities for 2040

ARCTIC FUTURE MAKERS

LEARNING WITH HIGH SCHOOL STUDENTS ABOUT THE FUTURE

Scenarios Development Workshop and PS193

23 and 24 February 2016 Kotzebue, Alaska

Participant Booklet

Table of Contents

We would like to acknowledge the efforts and feedback from the many expert reviewers of the workshop fact sheets and the material contained in this welcome booklet and the "State of Knowledge for Systems in Arctic Alaska" booklet. The NSSI Oversight Group, NSSI STAP and SSC, and Scenarios Consultative Group provided intellectual guidance and support for engaging stakeholders and subject matter experts. The Scenarios Network of Alaska and Arctic Planning (SNAP) also provided expertise along with the hard work of graduate students, notably Berill Blair, Douglas Cost, Kevin Hillmer-Pegram, and Rich Hum. Our undergraduate research student Trina Brower has been instrumental in discussions related to regional concerns. Drs. Olivia Lee and Hajo Eicken from the International Arctic Research Center also gave their input. Generous funding support for the Northern Alaska Scenarios Project came from the National Science Foundation. Generous funding to make this Arctic Future Makers workshop and course possible in Kotzebue came from the Northwest Arctic Borough Science Commission. Any errors in the welcome booklet and the state of knowledge booklet are unintentional and we welcome all feedback, corrections, clarifications, and concerns.

February 23, 2016

Good Morning Participant,

On behalf of the Arctic Future Makers project, the Northern Alaska Scenarios Project (NASP), and the University of Alaska Fairbanks we would like to welcome you this workshop and one-credit course hosted in Kotzebue, Alaska. We thank the Northwest Arctic Borough Science Commission for their funding and the Northwest Arctic Borough School District, in particular Ralph King and Tony Jones and those they work with for their assistance. We also thank you and your parents and families. Sincerely, we thank all the current and past residents of Qikiqtaġruk/Kotzebue and the region for hosting us on their lands.

These days are designed to explore the plausible futures of the Arctic Alaska region encompassed by the Northwest Arctic Borough. We are here to learn from you about community health and sustainability.

Working with you, the workshop will:

Survey your expertise as participants on the concepts of community health and sustainability in the region in order to help other young people to be resilient.

Integrate Indigenous, traditional, local and scientific knowledge in the understanding of community health and sustainability.

Imagine the possible futures from your perspectives and think through how to plan for the outcomes that are healthy and sustainable.

Develop key factors tied to health and sustainability that you want to observe and track in the coming decades.

You have been invited to participate because you have knowledge or expertise that will be considered, along with the knowledge and expertise of other participants, in the assessment of factors that may influence the future direction of northern Alaska. The core purpose of this scenarios effort is to enable more effective long-term coordination and collaboration of the research and monitoring needs across the residents and organizations in the borough for the future. However, we hope all workshop participants will also benefit from sharing their knowledge and learning from each other and that we will have fun.

Scenarios are an inclusive way of analyzing possible future events by considering alternative outcomes. Your active participation is important to help us in telling the story of what healthy, sustainable Arctic Alaska communities may look like through the year 2040 and beyond. Each invited participant will bring a unique perspective to the workshop and it is imperative to respect your ideas and the ideas of others so that we have a comprehensive view of possible futures. Scenarios are not "visioning exercises" nor are they "planning processes." We will not be debating what *should* happen, but discussing and exploring what COULD happen. The goal of scenarios is to give people and their organizations the power to anticipate different futures and design flexible strategies to reach long-term goals while keeping their core values intact.

Again, welcome! Sincerely,

Doug Cost and the Arctic Future Makers Team

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Scenario Team

Douglas Cost is a PhD student in Cross-Cultural Studies at the University of Alaska Fairbanks and a National Science Foundation (NSF) Resilience and Adaptation Program Fellow. His professional life has been primarily devoted to education. He has worked at many levels in different educational systems from middle school through the post- secondary level, in urban, suburban, and rural settings. His current research is with a multi-year project that engages K-12 school systems to define and track the ongoing development of healthy and sustainable communities. He is confident rural schools can be locations of resilience for their communities.

Dr. Amy Lauren Lovecraft, Professor of Political Science, University of Alaska Fairbanks. She is the team leader for the Northern Alaska Scenarios Project (NASP) that has been collaborating with arctic resident experts and using scenarios as tools to improve exchanges between scientists and different stakeholder groups in Alaska. It is important to her that local-scale concerns of villages, hub communities, and cities are heard by people making policy in Alaska and Washington D.C. She loves strong coffee, baking, and telling stories.

Kelsey Aho is a Master's student in Arctic and Northern Studies at the University of Alaska Fairbanks and a Resilience and Adaptation Program Fellow. She works domestically and abroad with youth in rural communities that live along political boundaries. She uses environmental communication to further relations between and within these communities. While Kelsey has worked in the Yukon-Kuskokwim Delta, her current research focuses on the communities along both sides of the Bering Strait and how they can influence marine mammal policy. Kelsey enjoys discussing how today's youth can impact tomorrow's policies.

Dr. Hajo Eicken, Professor, Sea Ice, Geophysical Institute & International Arctic Research Center (IARC), University of Alaska Fairbanks. He has expertise investigating sea ice properties in a changing climate, and has been fostering interdisciplinary research, interagency coordination and stakeholder engagement as chair of the U.S. interagency SEARCH program. He also worked on scenarios planning activities in the Arctic and has established a strong network of connections from working collaboratively with federal, state, local community and industry partners with over a decade of research experience in the Arctic. He knows great stories about the intelligence of lobsters. He also pickles things.

Agenda Day1

February 23, 2016

Location: Alaska Technical Center, Kotzebue

	Activity	**Lead**
8:00am	*Coffee and continental breakfast*	
8:30am	**Pre-workshop Survey Review of Logistics**	Amy
		Doug Cost
9:00am	**Experienced Community Leader Welcome Northwest**	Fred Smith Doug Cost
	Breaker Activity:	
	The Spaghetti Challenge	
9:30am	**Project Introduction- NASP to AFM Researcher**	Amy Lovecraft Amy,
	ns	g
10:00am	**3 Poems in Reflection & Write Time**	Doug
10:30am	***Break***	
10:45 am	**Review of Scenarios, Focal Question & Terms**	Amy
11:15 am	**Brainstorm- Healthy Sustainable Communities**	Doug
11:30 am	**Uncertainty & Change: 1990, 25 years ago**	Fred Smith
12:00pm	***Lunch (provided)***	
12:45pm	**Northern Alaska System Quiz**	Amy
1:15pm	**Identify Forces, Factors, Trends and Drivers**	Doug & Amy

3:00pm	***Break***	
3:15pm	**Identify Critical Uncertainties**	Doug & Amy
5:00pm	**End of Day 1 Workshop**	
6:00pm	***Dinner & Movie at the Youth Center***	Doug and Kelsey

Agenda Day 2

February 24, 2016

Location: Alaska Technical Center, Kotzebue

Time	Activity
8:00am	*Coffee and hot breakfast*- Check-in
9:00am	**Develop Scenario Characteristics** – 4 Quadrants Amy & Doug
10:00am	**Quadrant as Backbone of the Narrative-** Amy & Doug
10:30am	***Break***
10:45am	**Narrative Development** Doug
12:00pm	***Lunch (provided)***
1:00pm	**Fleshing Out the Details** Doug
2:15pm	**Plausible, Consistent, Imaginative & Fun** Doug
3:15pm	***Break***
3:30pm	**Implications & Indicators** Amy
4:00pm	**Strategies** Amy
4:30pm	**Survey** Amy
5:00pm	***End of Day 2 Workshop***
6:00pm	**Presentations of Scenarios and Reception Dinner- ATC**

Scenario Terms

Focal question

The focal question directs everyone participating in the scenario process to the broad subject that is important. The focal question is an anchor because it keeps everyone engaged in the subject that matters, for this project we want to stay focused on community health and sustainability. We want subjects related to this to dominate our conversations and we want to anchor our learning from one another to reaching answers to this question.

Scenario process

Identification and evaluation of plausible alternative futures for a region, in light of the identified driving forces and key uncertainties, in order to assess the implications of these alternative futures on the natural and socioeconomic resources of the region, and inform and prioritize long-term research and monitoring decisions for resource managers.

Storyline

A narrative description of changes that may take place within the region under a specific scenario, as defined by priority drivers.

Drivers of change

Also known as "key factors," "driving forces", or simply "drivers", these are factors or conditions which collectively will influence the trajectory, magnitude and speed of changes that are relevant to the focal question.

Uncertainties

Characteristics of systems that may be relevant to the focal question, but about which limited knowledge is available or over which there is disagreement about their current or future state.

Trends

Directional changes that are relevant to the focal question (i.e., that may influence or be influenced by the outcomes to that question) and are sufficiently clear that they are to some extent predictable.

Future projection

The way a key factor/driver of change could develop in the future. Key factors usually have two to five future projections. Future projections are the core components building individual scenarios.

Plausible/Plausibility

Future projections are required to be plausible in order for scenarios built with them can be stories that make sense. Note that plausibility of a future projection is not the same as its probability of occurring. Plausibility assessments are a key scoring component in the formal scenario building process that follows this workshop.

Consistency

Scenarios should be internally consistent, i.e., components of the scenario should not be in stark conflict to each other, or mutually exclusive of occurring. Consistency is another important scoring criteria during the scenario process following this workshop.

Robustness

A robust scenario is both plausible and consistent, but not necessary the most plausible or most consistent.

Indicator

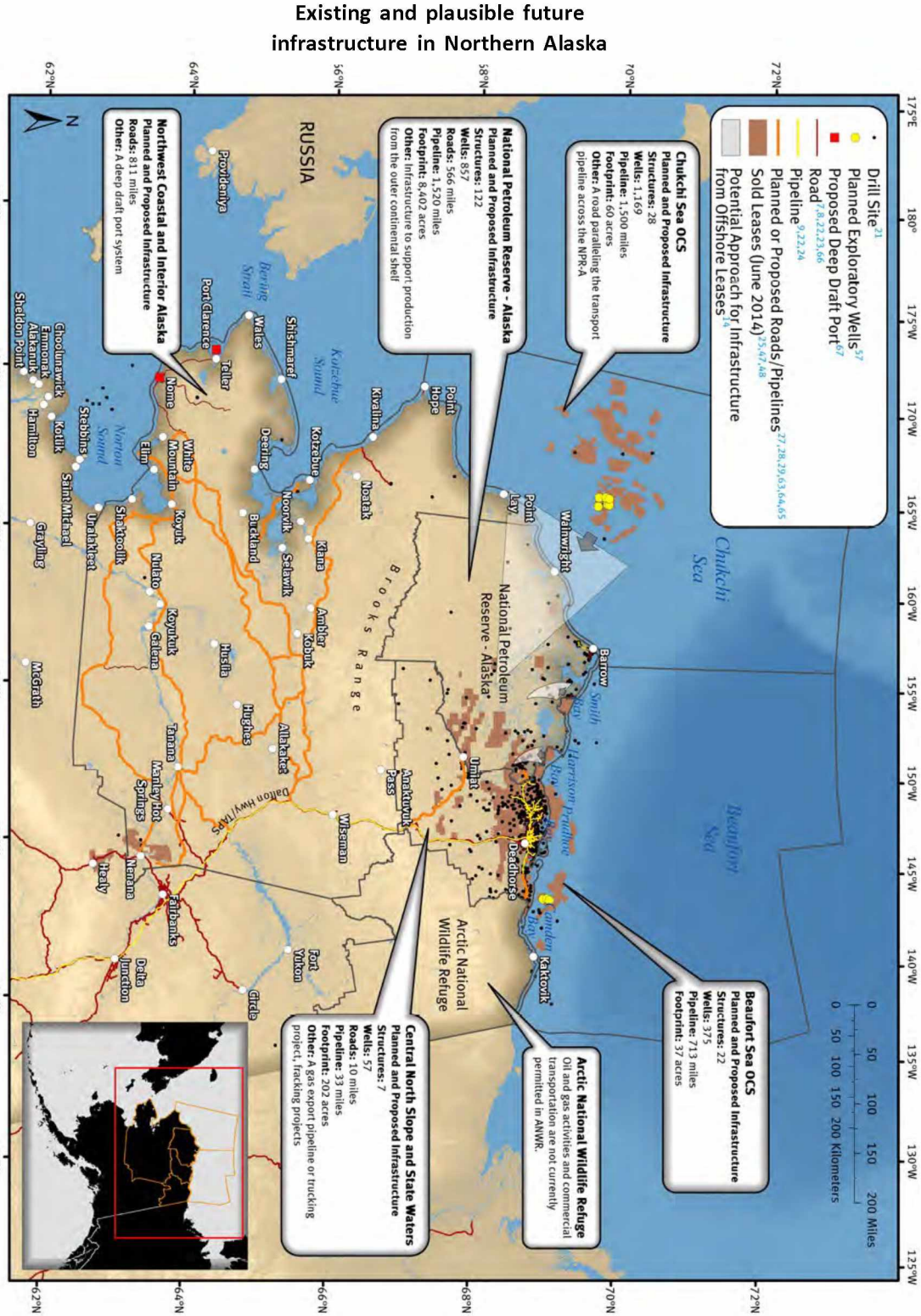
An indicator is a something that helps us recognize and measure the state or level of something. For example, the warming temperatures in the Arctic are an indicator of a changing climate.

Wild cards

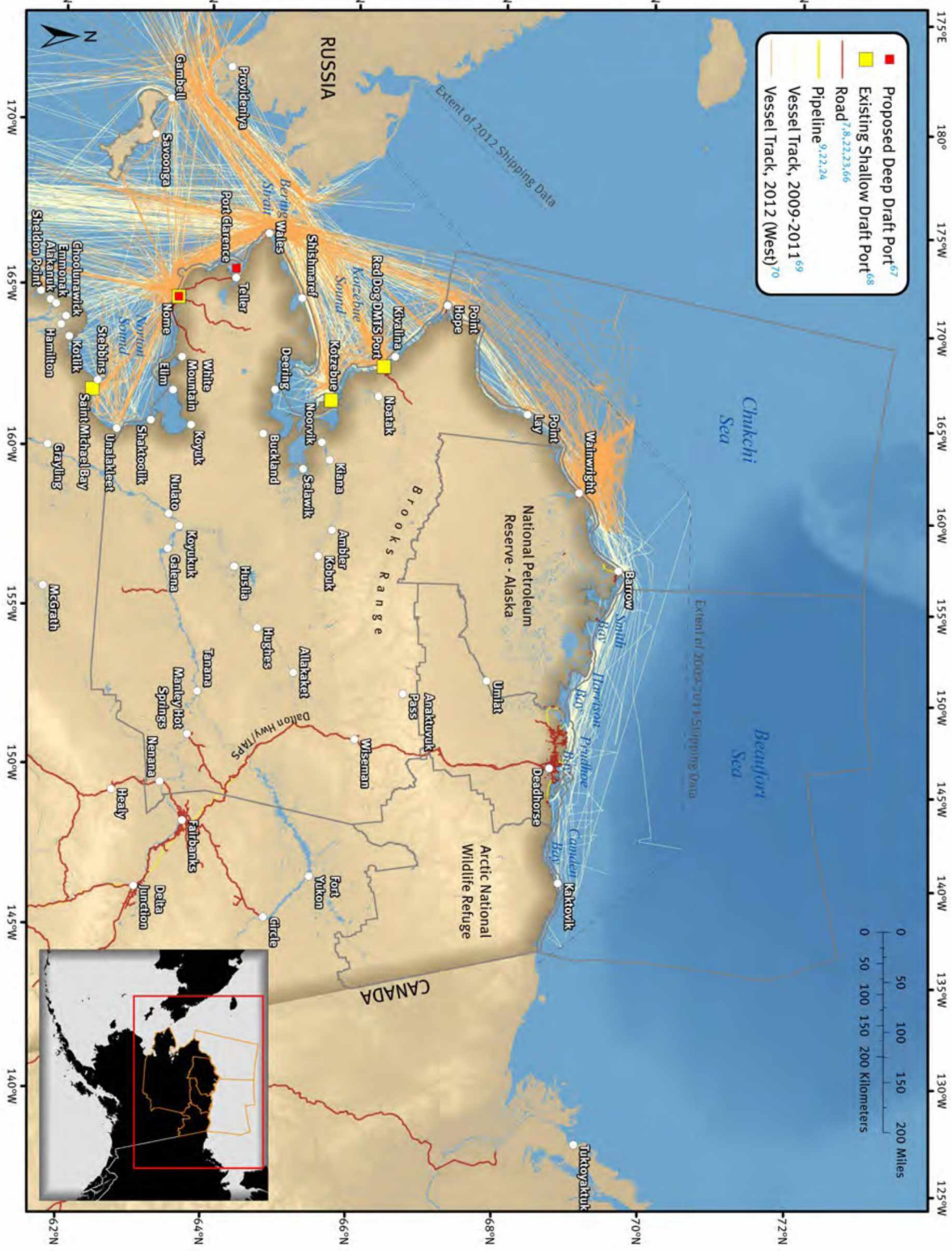
These are highly unlikely, low probability events that if they were to happen would significantly impact our answer to the focal question. Wild cards are surprises and can be good or bad. For example, it would be highly surprising and highly unlikely that an asteroid will hit earth. On other hand, the recent drop in the price of oil is *not* a wild card – that is an event that was likely to happen, it is just that no one knew when. We use wild cards in scenarios processes to help us prepare for the unexpected.

System

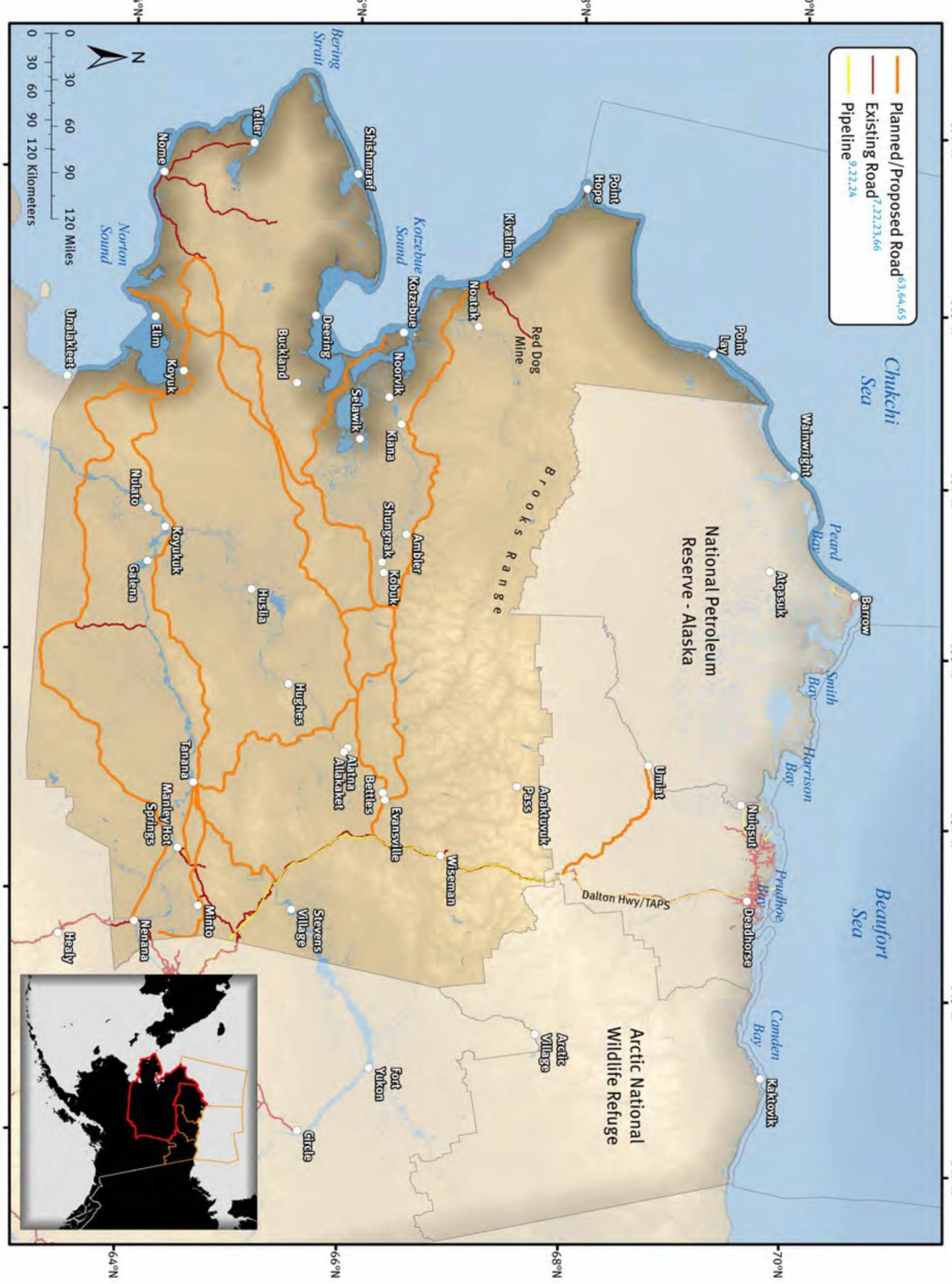
System is a phrase used to explain a set of things that together form a whole. When we talk about the "justice system" we would be referring to police officers, judges, buildings where trials take place, jails, lawyers, and sets of rules that guide all these actors. There are clearly more parts of this system, but the boreal forest would not be included. On the other hand, the "sea ice system" could include marine mammals, ice, people on snowmachines traveling on ice, seal hunters, but it would not include courtrooms. Systems of course can overlap with one another. If someone commits murder out on the ice edge state troopers may have to travel out there to view the crime scene.

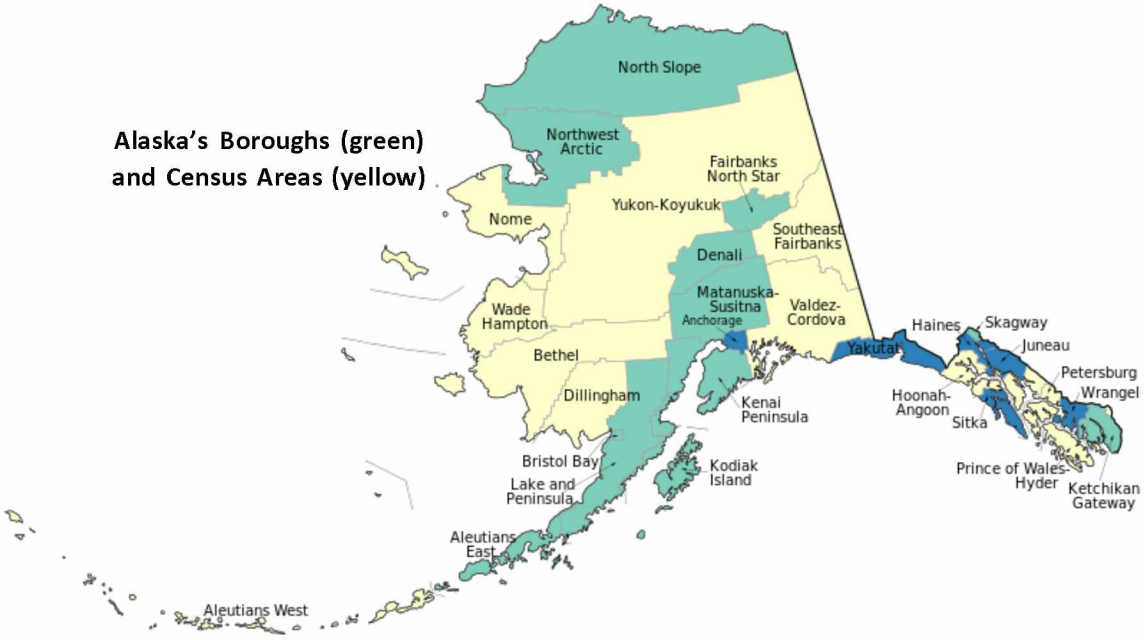

Existing and plausible future infrastructure in Northern Alaska
Drill Site[21]
Planned Exploratory Wells[27]
Proposed Deep Draft Port[67]
Road[7,8,22,23,66]
Pipeline[9,22,24]
Planned or Proposed Roads/Pipelines[27,28,29,63,64,65]
Sold Leases (June 2014)[25,47,48]
Potential Approach for Infrastructure from Offshore Leases[14]
Chukchi Sea OCS
Planned and Proposed Infrastructure
Structures: 28
Wells: 1,169
Pipeline: 1,500 miles
Footprint: 60 acres
Other: A road paralleling the transport pipeline across the NPR-A
National Petroleum Reserve - Alaska
Planned and Proposed Infrastructure
Structures: 122
Wells: 857
Roads: 566 miles
Pipeline: 1,520 miles
Footprint: 8,402 acres
Other: Infrastructure to support production from the outer continental shelf
Northwest Coastal and Interior Alaska
Planned and Proposed Infrastructure
Roads: 811 miles
Other: A deep draft port system
Beaufort Sea OCS
Planned and Proposed Infrastructure
Structures: 22
Wells: 375
Pipeline: 713 miles
Footprint: 37 acres
Arctic National Wildlife Refuge
Oil and gas activities and commercial transportation are not currently permitted in ANWR.
Central North Slope and State Waters
Planned and Proposed Infrastructure
Structures: 7
Wells: 57
Roads: 10 miles
Pipeline: 33 miles
Footprint: 202 acres
Other: A gas export pipeline or trucking project, fracking projects
RUSSIA
Chukchi Sea
Beaufort Sea
Bering Strait
Kotzebue Sound
Norton Sound
Brooks Range
National Petroleum Reserve - Alaska
Arctic National Wildlife Refuge
Dalton Hwy/TAPS
Providenlya
Port Clarence
Teller
Wales
Shishmaref
Point Hope
Kivalina
Noatak
Kotzebue
Deering
Noorvik
Buckland
Selawik
Kiana
Ambler
Kobuk
Nome
Elim
White Mountain
Koyuk
Shaktoolik
Unalakleet
Saint Mikhael
Stebbins
Kotlik
Hamilton
Sheldon Point
Emmonak
Alakanuk
Chevak
Grayling
Nulato
Koyukuk
Galena
Huslia
Hughes
Alatakaket
McGrath
Tanana
Manley Hot Springs
Healy
Nenana
Fairbanks
Delta Junction
Circle
Fort Yukon
Wiseman
Anaktuvuk Pass
Utqiagvik
Wainwright
Point Lay
Barrow
Atqasuk
Nuiqsut
Deadhorse
Kaktovik
Prudhoe Bay
Harrison Bay
Smith Bay
0 50 100 150 200 Miles
0 50 100 150 200 Kilometers
N

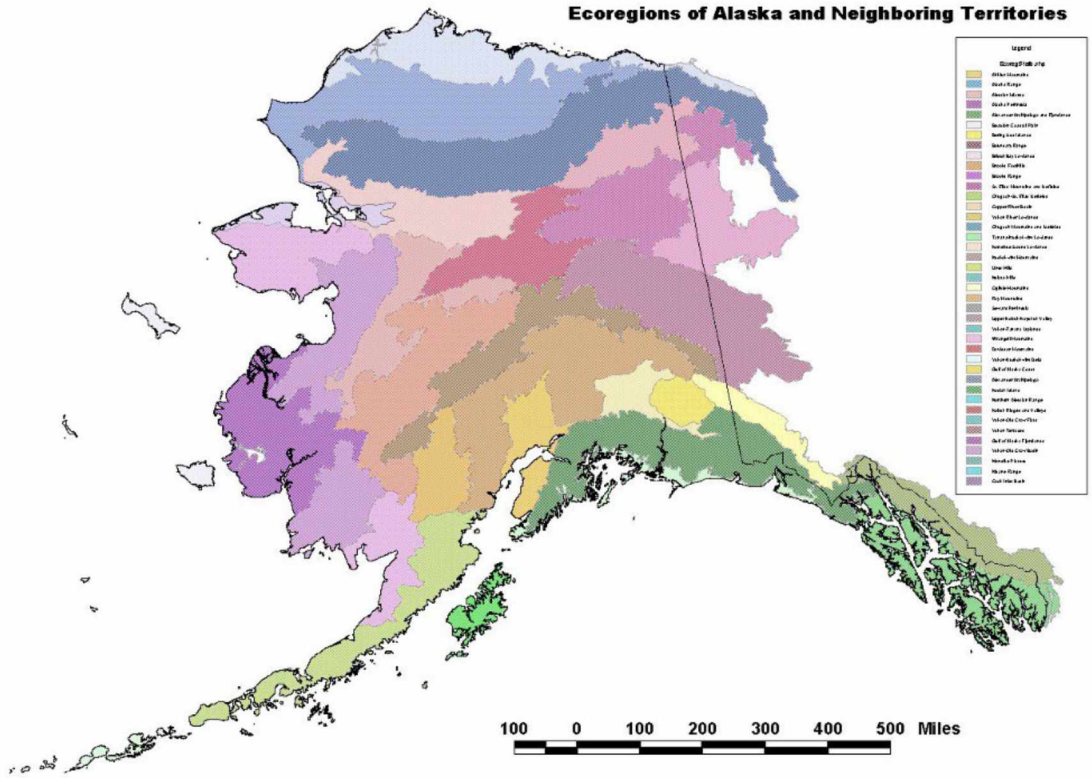
Marine vessel activity in waters off Northern Alaska

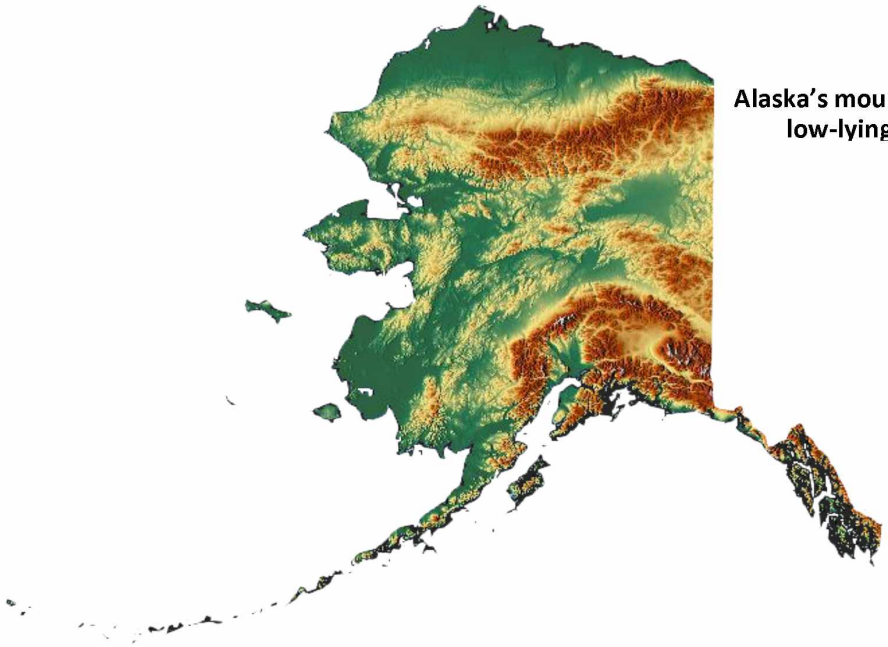

Proposed Deep Draft Port[67]
Existing Shallow Draft Port[68]
Road[7,8,22,23,66]
Pipeline[8,22,24]
Vessel Track, 2009-2011[69]
Vessel Track, 2012 (West)[70]
Extent of 2012 Shipping Data
Chukchi Sea
Beaufort Sea
Bering Strait
Kotzebue Sound
Norton Sound
Harrison Bay
Prudhoe Bay
Camden Bay
Brooks Range
RUSSIA
CANADA
Arctic National Wildlife Refuge
National Petroleum Reserve - Alaska
Dalton Hwy/TAPS
Gambell
Savoonga
Provideniya
Port Clarence
Teller
Wales
Shishmaref
Red Dog DMTS Port
Kivalina
Point Hope
Point Lay
Wainwright
Barrow
Nome
Elim
White Mountain
Koyuk
Shaktoolik
Unalakleet
Saint Michael
Stebbins
Koyuk
Golovin
Grayling
Buckland
Deering
Noorvik
Kotzebue
Noatak
Selawik
Kiana
Ambler
Kobuk
Shungnak
Kobuk
Koyukuk
Galena
Nulato
Huslia
Hughes
Allakaket
Alatna
Bettles
Anaktuvuk Pass
Umiat
Wiseman
Deadhorse
Kaktovik
Arctic Village
Venetie
Fort Yukon
Circle
Tanana
Manley Hot Springs
Nenana
Fairbanks
Healy
Delta Junction
McGrath
Hamilton
Koyuk
Stebbins
Saint Michael
Unalakleet
Shaktoolik
Elim
White Mountain
Nome
Teller
Port Clarence
Shishmaref
Wales
Gambell
Savoonga
Provideniya
Sheldon Point
Emmonak
Alakanuk
Chevak
Scammon Bay
Hooper Bay
Chefornak
Kipnuk
Kwigillingok
Eek
Tuntutuliak
Napakiak
Napaskiak
Oscarville
Bethel
Kwethluk
Akiachak
Akiak
Tuluksak
Lower Kalskag
Aniak
Chuathbaluk
Crooked Creek
Red Devil
Sleetmute
Stony River
Lime Village
Nikolai
McGrath
Takotna
Ophir
Iditarod
Flat
Shageluk
Anvik
Grayling
Holy Cross
Russian Mission
Marshall
Pilot Station
Mountain Village
Pitkas Point
Russian Mission
Kotlik
Emmonak
Alakanuk
Hamilton
Koyuk
Stebbins
Saint Michael
Unalakleet
Shaktoolik
Elim
White Mountain
Nome
Teller
Port Clarence
Shishmaref
Wales
Gambell
Savoonga
Provideniya
Sheldon Point
Chevak
Scammon Bay
Hooper Bay
Chefornak
Kipnuk
Kwigillingok
Eek
Tuntutuliak
Napakiak
Napaskiak
Oscarville
Bethel
Kwethluk
Akiachak
Akiak
Tuluksak
Lower Kalskag
Aniak
Chuathbaluk
Crooked Creek
Red Devil
Sleetmute
Stony River
Lime Village
Nikolai
Takotna
Ophir
Iditarod
Flat
Shageluk
Anvik

Existing and potential future roads in Northern Alaska

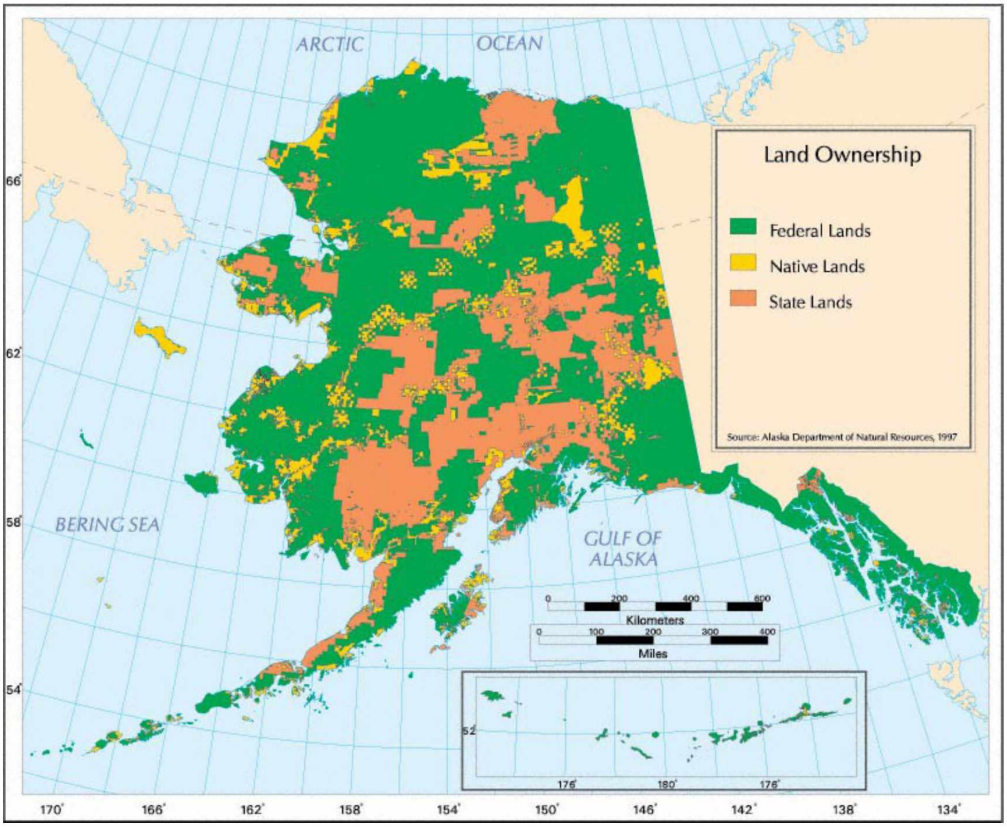



Alaska's Boroughs (green)
and Census Areas (yellow)
North Slope
Northwest
Arctic
Fairbanks
North Star
Yukon-Koyukuk
Nome
Southeast
Fairbanks
Denali
Matanuska-
Susitna
Anchorage
Valdez-
Cordova
Wade
Hampton
Bethel
Yakutat
Haines
Skagway
Juneau
Petersburg
Wrangel
Hoonah-
Angoon
Sitka
Dillingham
Kenai
Peninsula
Bristol Bay
Lake and
Peninsula
Kodiak
Island
Prince of Wales-
Hyder
Ketchikan
Gateway
Aleutians
East
Aleutians West


Ecoregions of Alaska and Neighboring Territories
100 0 100 200 300 400 500 Miles



Alaska's mountains (brown) and low-lying areas (green)



Appendix 6 Syllabus- PS 193: Introduction to Arctic Futures Studies

PS 193: INTRODUCTION TO ARCTIC FUTURES STUDIES- (1 credit)

Spring 2016: 15 February - 11 March; February 23, 24 in Kotzebue

At the Alaska Technical Center

Instructors: Douglas Cost- dscost@alaska.edu Amy Lovecraft- allovecraft@alsaka.edu

Cost - Phone: (907) 474-1556 Office: IARC 203

Lovecraft - (907) 474 - 2688 Office: Gruening 602B

Office Hours: by appointment, before or after class meetings

Course Description

This course will introduce students to the scenarios methodology and futures studies through research-based activities leading to identification of key factors, drivers and indicators that will influence the health and sustainability of their Northern Arctic communities now, to, and through the year 2040. Students will use and rely on what they are learning in their high school science and other classes, as well as their own experiences, related to climate change and the landscape and people of their region to explore what their home will be like two decades from today. (1 credit hour)

Course Objectives/Goals

The overarching goal is to create a sense of connection between high school science and "real world" decision-making (e.g., borough level planning, the Alaska Arctic Policy Commission).

The goal is to allow Arctic youth the opportunity to examine and understand their priorities and impacts on outcomes in relation to health and sustainability of their communities. The students and youth of a community are vital to maintain the cultural, economic, and social knowledge related to the future of their community's well being. Our goal for the students specifically is for them to develop a sense of what they want for themselves and their community in 2040 and begin to make plans now for reaching that target.

Student Learning Outcomes

1. Students will discuss and identify priorities for their communities around health and sustainability.
2. Students will use what they have learned on the land, at home, and in the classroom to discuss and determine what key indicators are most important as decisions are made concerning community futures.
3. Students will demonstrate the evidence of their deliberations through the final project of scenarios quadrant exercise and the development of narratives for four possible arctic Alaska futures.
4. Students reflect on the workshop over the course of three written assignments.

Required Readings (we will provide all the readings for the students, they will not purchase texts)

Leadership in Indigenous Education – personal stories – chapters 21 and 22

Workbook materials (given to them at workshop: State of Knowledge for Systems in Arctic Alaska)

Various Handouts in lecture

Course Policies

Active participation through in lecture interaction with facilitators and peers, completion of surveys (opt-out clause provided), attendance for the duration of the workshop, and post-workshop engagement with instructors is **REQUIRED**. It is vital to the learning experience for you and your fellow students. We will engage in conversations, activities, and assignments based on your learning and understanding of what it means to be an active inquirer/researcher of Arctic futures. All assignments should be submitted on or before the due dates as noted in the course assignments section.

Instructional Methods

This course is a blended class delivered in mixed formats, including: face-to-face lecture, experiential learning through activities, phone/Skype conferencing, and through e-mails.

Late Assignments

Points will be deducted for assignments turned in late.

Academic Integrity

Ethics, Professional Conduct Courtesy and respect for others are expected norms in any setting and are the norms at the University of Alaska Fairbanks. The use of the American Psychological Association (APA) approved guidelines for ethical behavior is actively encouraged in regard to respectful language usage (i.e., gender, age, ableness, sexual orientation, race, ethnicity,

nationality, or other cultural factors). The University of Alaska Fairbanks policies are in effect in this class. Academic honesty is required of all members of a learning community. Unethical behavior such as plagiarism or using others' work without appropriate acknowledgement in presentations, papers, or other course assignments is not tolerated.

Plagiarism Policy

"Three different acts are considered plagiarism: (1) failing to cite quotations and borrowed ideas, (2) failing to enclose borrowed language in quotation marks, and (3) failing to put summaries and paraphrases in your own words" (Hacker, 2010, p. 359). The American Psychological Association (APA) will be the style you will be using to format papers including citations and bibliographies. Plagiarism in any form will not be tolerated. If you are unsure, ask me. **If you plagiarize, you will receive a failing grade for the course.** Further action, such as expulsion, will also be considered.

Student Support Services - http://www.uaf.edu/sss/

The Division of Student Services provides student-centered programs and services designed to assist students in achieving their personal, academic and career goals. In collaboration with the academic deans, we lead the university in recruiting a diverse student body. With the use of ongoing assessment we support and develop programs and communities that contribute to the retention, success and leadership development of students.

The Writing Center- http://www.uaf.edu/english/writing-center/

The Writing Center is a resource for all students to use when working on their writing. There are helpful writing tutors who spend time with you going over your work and helping you to be a better writer. **Use this resource.** This is a great resource to utilize at any stage in the writing process, drafting, organizing, or revising. The session lasts 30 minutes. You can do it via phone or Skype, the center can also provide fax tutorial appointments at (907) 474-5314.

Writing Center hours: 10 a.m. – 4 p.m. and 7p.m. – 10 p.m. Monday- Thursday

10 a.m. – 1 p.m. Fridays and 1 p.m. - 6 p.m. Sundays

Always start your writing early and remember, "[re]writing is the essence of writing well" (Zinsser, 2006, p. 83).

Rural Student Services (RSS)- https://www.uaf.edu/ruralss/

Rural Student Services is another excellent resource for students who are coming from the rural areas of Alaska. They are there to assist you in achieving student success by linking you to current information pertinent to your education, lifestyle and goals. Located in the Brooks building room 200, they may also be reached at 474-6619. The Rural Student Service Center's hours are Monday – Friday 8:00 a.m. – 5:00 p.m. A Writing Center tutor is on duty at RSS Monday - Thursday from 2:00 p.m. - 4:00 p.m.

Disability Services- http://www.uaf.edu/disability/

At UAF the **Office of Disability Services** implements the Americans with Disabilities Act (ADA). We provide reasonable accommodations for students with disabilities. You can contact the Office in 208 WHIT at Tel: 474-5655 TTY: 474-1827

Assignments & Evaluation = 100%

1. Interview of family member or elder on what life was 25 years ago, 1990 (10%) To be completed after the workshop

2. Scenario Quadrants and Group Input Assessment (25%) – in workshop

3. Scenario Narrative (25%) – in workshop

4. Group Presentation of Scenario Quadrant and Narrative (20%) – in workshop

5. Final Essay (10%) To be completed after the workshop

6. Follow-up Feedback on Final Essay Tutorial (5%) To be completed after the workshop

7. **Reading Responses (5%)** To be completed after the workshop

Course Outline

Date of Class	**Topics & Readings**	**Assignments Due**
2/15-22/2016	Complete survey consent form	Prior to or on 23 February
Day 1		
2/23/2016	Arrival – General ATC dormitory orientation	
Day 2		
2/23/2016	Day 1 of workshop Evening - Movie and discussion	8 am – 4:30pm Lecture Doug Cost, Amy Lovecraft, With guest lecture by Fred Smith. 6pm – 8:30pm Meeting for movie,

		dinner, and discussion
Day 3		
2/24/2016	Day 2 of Seminar Evening- Presentations of results through art. Each group uses mixed media (e.g., poetry, imagery, dance, song) that explains your story and what it means for your community.	8:30am – 4:30pm Lecture Doug Cost, Amy Lovecraft 6pm – 8:30pm student presentation of workshop process and results.
After the workshop		
2/25/2016 – 3/11/2016	Via Skype Feedback and Assessment of Futures Plan and Essay **Grading** – Note: any grade below a "B" is generally not acceptable in a graduate program. 97-100 points = A+ 93-96 = A	**Due 10 March 2016:** All interviews must be discussed in a 300-400-word essay. The essay must contain: (1) The name of who was interviewed, (2) When the interview took place, (3) three of the questions you asked during the interview (4) a summary of what you learned in the answers to those questions. **Due 7 March 2016**: Essay 1000 words in response to the question

	90-92 points = A- 87-89 points = B+ 83-86 points = B 82-80 points = B- 77-79 points = C+ 73 -76 points = C 72-70 points = C- **You will accumulate 75 points during the workshop. The remaining 25 points you can earn from completing and send us the last three assignments on the right.**	*Think about the scenarios workshop. What were some ways it may have changed your thinking about your own future and the future of your community?* **Due 10 March 2016:** Respond in 250 words for each reading (1) "For the Native American student" (2) "Path of a Modern Warrior." *For each one, discuss how is what they have to tell you is similar to and different from your own experience as an Indigenous person?*

Appendix 7 Poems Shared in Workshop

Hyperboreal

By Joan Kane

Arnica nods heavy-headed on the bruised slope.
Peaks recede in all directions, in heat-haze,
Evening in my recollection.

The shield at my throat ornamental and worse.
We descended the gully thrummed into confusion
With the last snowmelt a tricklet into mud, ulterior---

One wolfbane bloom, iodine-hued, rising on its stalk
Into the luster of air: June really isn't June anymore,
Is it? A glacier's heart of milk loosed from a thousand

Summer days in extravagant succession,
From the back of my tongue, dexterous and sinister.

Kinship

BY URSULA LE GUIN

Very slowly burning, the big forest tree
stands in the slight hollow of the snow
melted around it by the mild, long
heat of its being and its will to be
root, trunk, branch, leaf, and know
earth dark, sun light, wind touch, bird song.

Rootless and restless and warmblooded, we
blaze in the flare that blinds us to that slow,
tall, fraternal fire of life as strong
now as in the seedling two centuries ago.

Elegy for a Walnut Tree

By W. S. Merwin

Old friend now there is no one alive
who remembers when you were young
it was high summer when I first saw you
in the blaze of day most of my life ago
with the dry grass whispering in your shade
and already you had lived through wars
and echoes of wars around your silence
through days of parting and seasons of absence
with the house emptying as the years went their way
until it was home to bats and swallows
and still when spring climbed toward summer
you opened once more the curled sleeping fingers
of newborn leaves as though nothing had happened
you and the seasons spoke the same language
and all these years I have looked through your limbs
to the river below and the roofs and the night
and you were the way I saw the world

Appendix 8 Scavenger Hunt

1. In Alaska's health care system there is an Alaska Tribal Health System (ATHS). What act of Congress created this health care system and when?

2. Air quality matters to our health. Where do most emissions on the North Slope come from? Is dust a problem in the Northwest Arctic Borough?

3. What percentage of adults participates in subsistence activities "Harvest, hunt, fish" in the Northwest Arctic Borough? In the North Slope Borough?

4. Snowfall matters to animals' life cycles and to humans. What is snowfall projected to do by 2050?

5. The state of Alaska is currently dependent on oil revenue to fund the majority of its programs. What percentage of revenue in the state's taxes come from oil and gas production?

6. What percentage of jobs comes from the petroleum sector? What percentage comes from the federal government?

7. Is oil production on the North Slope rising or declining? What is forecast into the future?

8. What is the turnover rate (the rate at which people leave) for principals in Alaska's rural school districts? In urban districts?

9. What are the four "Emerging Arctic Security Challenges?"

10. Which judicial district is Kotzebue in?

Appendix 9 AFM Narrative Scenario Generation Worksheet Workshop

February 24, 2016

1. The character sketch
What would your character(s) need in 2040 to thrive in this new Northern Alaska where the future projections of this raw scenario come to fruition?
Level 1. Think name, age, mannerisms, job, family, hobbies, & one secret no one knows

Level 2. Think skills, relationships, resources, and networks….

Level 3. Use a physical space to convey character

2. Setting
We know approximate time 2016-2040 but we've also learned things in the past that may be relevant to this future, include these learnings when necessary
Physical spaces and institutional spaces

Set the stages on the two ends of the time line and plot points between, think scales.

3. Plot- develop a storyline
The series of events that lead from 2016 to 2040
Incorporating the key factors and their future projections and how they have played out over the next 24 years. Logical, plausible, consistent, creative, imaginative and fun are the keys here.
Think about:
Nuance & Relationships – each key factor should have positive and negative aspects discussed and linked to the characters and the story should relate the key factors to each other and other key factors you have identified.
Uncertainties & Choices – the stories need not impart any lessons but they should pose choices so that anyone listening to them can interpret the story and then decide for him or herself what decision to make

Identify:
-Major differences from present and expected future that the story illustrates
-Leading indicators that would appear before this scenario came true
-Implications questions about your story
-Beginning, middle and end

Appendix 10 Placing Created Characters into the Futures and You are a Reporter Worksheets
Name: _____-

What are you good at?

What do you want to be doing at the age of 40?

Your hobbies? Your job?

Now go to each future (1), (2), (3), (4) what do you need to do to reach your goals in each future?

(1) What do I have to do to reach my goals?

(2) What do I have to do to reach my goals?

(3) What do I have to do to reach my goals?

(4) What do I have to do to reach my goals?

You are a reporter! Go to a new future and find out what it looks like.

Give that future a title:

What is the best about this future?

What is the worst about this future?

How did this future come to be? What happened to make this future exist?

Appendix 11 Institutional Review Board Approval Letter

UNIVERSITY OF ALASKA FAIRBANKS

(907) 474-7800
(907) 474-5444 fax
uaf-irb@alaska.edu
www.uaf.edu/irb

Institutional Review Board

909 N Koyukuk Dr. Suite 212, P.O. Box 757270, Fairbanks, Alaska 99775-7270

February 26, 2016

To:	Douglas Cost, MA, MFA Principal Investigator
From:	University of Alaska Fairbanks IRB
Re:	[849337-2] Arctic Future Makers: Scenarios with High School Students

Thank you for submitting the Amendment/Modification referenced below. The submission was handled by Expedited Review under the requirements of 45 CFR 46.110, which identifies the categories of research eligible for expedited review.

Title:	Arctic Future Makers: Scenarios with High School Students
Received:	February 20, 2016
Expedited Category:	7
Action:	APPROVED
Effective Date:	February 26, 2016
Expiration Date:	January 12, 2017

This action is included on the March 2, 2016 IRB Agenda.

No changes may be made to this project without the prior review and approval of the IRB. This includes, but is not limited to, changes in research scope, research tools, consent documents, personnel, or record storage location.

Appendix 12 AFM Assent Form

Assent Form

Study Title: Arctic Future Makers: Scenarios with High School Students

IRB # 849337-1

Date Approved: January 12, 2016

Description of the study

You are being asked to take part in a study. This is a study about the usefulness of scenarios workshops for informing community options. The goal is to understand how participants understand community health and the workshop process. We also seek to understand how the workshop can provide information to the community. The study will assist in understanding what key factors affect community health and sustainability. Each person's idea of a healthy community might be different. Gathering your input is important to the study. You are being asked to participate because of your knowledge as a young person.

You will be asked to complete a survey at the start and end of the workshop. It will take about 30 minutes to complete. Before signing, please read this form and ask any questions.

Risks and Benefits of Being in the Study

This study poses little risk to you. You may stop answering the questions at any time. There are no direct benefits to you from taking part in the study. Your input will add to the understanding of the scenarios process, community health and sustainability. We hope that this project will help us learn about Alaska rural community needs during change. The information from this project will be shared with the participants. It will be returned in a report. The report from the workshop might inform other ongoing work related to community health and sustainability in Northern Alaska.

Confidentiality

- The data derived from this study may be published in academic journal article(s). **You will not personally be identified** without your assent (and your parent's consent while you are under 18).
- We will not audio or videotape the workshop. We will take photos. We are taking notes during the workshop. **We will ask your permission (and your parent's permission while you are under 18) before using any photos.**

- Any information about you from the workshop and survey including answers to interview questions (pictures, verbal, written) **will not be linked to your name. We will ask you and your parent if we would like to identify you.**

Voluntary Nature of the Study

We thank you very much for participating in this survey. Your **decision to participate in this study is completely voluntary.** You may choose not to answer any part of the survey or stop taking part at any time without any penalty.

Travel to Kotzebue and Supervision of Students from other Northwest Arctic Borough Villages

Students will fly by themselves to Kotzebue. Upon arrival at the airport, Douglas Cost or Amy Lovecraft will meet the students. They will then be taken to the STAR of the Northwest Dormitory where they will be staying with the other "out of Kotzebue" students. There will be chaperones from Qikiqtagurk Inupiaq Youth Council and/or the Northwest Arctic Borough School District (NWABSD) dorm supervisors present at all times.

Contacts and Questions

Please ask me any questions you have about the study now. If you have questions later, you or your parent/guardian can contact Doug Cost, the project coordinator or email me at **dscost@alaska.edu.** If you have additional questions regarding rights as a research subject, please contact the **Research Integrity Administrator** at (907) 474-7800 or ghundertmark@alaska.edu

Statement of Assent:

I know what this study is about and my questions have been answered. I want to be part of this study.

_____

Student's Printed Name

_____

Signature of Student & Date

Appendix 13 AFM Statement of Informed Consent

Statement of Informed Consent

Study Title: Arctic Future Makers: Scenarios with High School Students

IRB# 849337-1 **Date approved:** January 12, 2016

Description of the study

Your child is being asked to take part in a study as a part of the scenarios workshop. This is a study about the usefulness of scenarios workshops for informing community options. The goal is to understand how participants understand their communities and the workshop process. We also seek to understand how the workshop can provide information to the community. The study will assist in understanding what key factors affect community health and sustainability. Each person's idea of a healthy community might be different. Gathering your student's input is important to the study. He or she is being asked to participate because of his or her knowledge as a young person.

If you consent for your child to participate, he or she will be asked to complete a survey at the start and end of the workshop. It will take about 30 minutes to complete. Before signing, please read this form and ask any questions. 8.8

Risks and Benefits of Being in the Study

This study poses little risk to your child or you. Your child may stop answering the questions at any time. There are no direct benefits to you or your child from taking part in the study. Your child's input will add to the understanding of the scenarios process, community health and sustainability. We hope that this project will help us learn about Alaska rural community needs during change. The information from this project will be shared with the participants. It will be returned in a report. The report from the workshop might inform other ongoing work related to community health and sustainability in Northern Alaska. 8.5

Confidentiality

- The data derived from this study may be published in academic journal article(s). Y**our child will not personally be identified** without your consent.
- We will not audio or videotape the workshop. We will take photos. We are taking notes during the workshop. **We will ask your permission before using any photos.**
- Any information about your child from the workshop and survey including answers to interview questions (pictures, verbal, written) **will not be linked to your child's name. We will ask you if we would like to identify your child. 7.5**

Voluntary Nature of the Study

We thank you very much for permitting your child to participate in this survey. Your **decision to permit participation in this study is completely voluntary.** Your child may choose not to answer any part of the survey or stop taking part at any time without any penalty. 9.6

Travel to Kotzebue and Supervision of Students from other Northwest Arctic Borough Villages

Students will fly by themselves to Kotzebue. Upon arrival at the airport, Douglas Cost or Amy Lovecraft will meet the students. They will then be taken to the STAR of the Northwest Dormitory where they will be staying with the other "out of Kotzebue" students. There will be chaperones from Qikiqtagurk Inupiaq Youth Council and/or the Northwest Arctic Borough School District (NWABSD) dorm supervisors present at all times. 9.7

Contacts and Questions

If you have any questions, please contact Doug Cost, the project coordinator or email me at **dscost@alaska.edu.** If you have additional questions regarding rights as a research subject, please contact the **Research Integrity Administrator** at (907) 474-7800 or ghundertmark@alaska.edu

The University of Alaska Fairbanks (UAF) Institutional Review Board (IRB) reviews research projects involving people. This review is done to protect the people like you involved the research. If you have questions or concerns about your rights as a research participant, please contact the UAF Office of Research Integrity at
(907) 474-7800 (Fairbanks area)
1-866-876-7800 (toll-free, outside the Fairbanks area) or at
uaf-irb@alaska.edu

Statement of Consent:

I understand the procedures described above. My questions have been answered to my satisfaction. I agree that my child can participate in this study. I am 18 years old or older. I have been provided a copy of this form.

_____

Signature of Parent or Guardian & Date

_____

Signature of Person Obtaining Consent & Date

Appendix 14 AFM Pre-workshop Participant Survey

Arctic Future Makers Project

Learning about the Future with High School Students

Pre-Workshop Participant Survey

Kotzebue, Alaska

February 23 and 24, 2016

If you have any questions about this survey, contact

Doug Cost

dscost@alaska.edu

(907.474.1556)

University of Alaska Fairbanks

Department of Political Science

PO Box 756420

Fairbanks, AK 99775-6420

Survey Number_____

This is information about each participant that helps us to understand the workshop participants' backgrounds better. Please remember, these surveys are CONFIDENTIAL.

1. In what year were you born? _____

2. Where were you born? _____

3. Please select your gender:

- ○ Male
- ○ Female

4. Where do you live? _____

5. What grade are you in now? _____

6. Are you an Alaska Native? Yes _____ **No** _____

If yes, are you **Iñupiaq? ----**_____

If you are not **Iñupiaq what is your primary identification?** _____

One of the main goals of scenario creation is to help people think ahead and prepare for surprises, whether good or bad. This next section of the survey is designed to help us understand what you think communities may need to be prepared for the future.

7. For the following statements, please think of the community (town, city, village) you live in, and select the answer that best reflects your opinion:

	Very True	Somewhat True	Neutral	Somewhat Untrue	Not True
My community is prepared to face future economic and environmental challenges.	○	○	○	○	○
My community is prepared to prosper even in turbulent times.	○	○	○	○	○

8. When you think about the perfect healthy sustainable community in Alaska, what 5-10 words come to your mind that would describe it?

9. When you think about the future what do you think are the FIVE things that pose the greatest *risk* to healthy, sustainable communities in Northern Alaska?

The Northern Alaska region is primarily Iñupiat; this part of the questionnaire is designed to help us think about how values matter, and in what ways.

10. Please think of the following Iñupiaq Traditional Values, consider the question asked in each column, and mark your answers in the circles:

	Mark all the values you have heard talked about or you have read about	Which 5 of these will be most important to a future of Healthy Sustainable Communities?
		Choose 5 only
Knowledge of Language	○	○
Knowledge of Family Tree	○	○
Cooperation	○	○
Family Roles	○	○
Respect for Others	○	○
Sharing	○	○
Domestic Skills	○	○
Respect for Nature	○	○
Hard Work	○	○
Humility	○	○
Humor	○	○
Respect for Elders	○	○
Spirituality	○	○
Responsibility to Tribe	○	○
Hunter Success	○	○
Avoid Conflict	○	○
Love for Children	○	○

11. When you communicate your thoughts and ideas about your life and community which communication tools you regularly use?

Telephone	E-mail	(Snail) mail
Texting	Twitter	LinkedIn
Facebook	Instagram	YouTube
Pinterest	Google+	Blogs
General webpages	Radio	Face to Face talking

Other: _____

Education is a factor in the livelihoods of the Arctic Alaska region. We would like to understand what role you think it plays in the future.

12. For each question please choose the answer that best reflects your opinion.

	Very Important	Somewhat Important	Neutral	Somewhat Unimportant	Unimportant
How important is formal education (K-12 and beyond) to the future *you are pursuing?*	○	○	○	○	○
How do you view the importance of formal (K-12 and beyond) education *for the future of the region?*	○	○	○	○	○
How important is traditional knowledge education, learning skills outside of schools at home or on the land or water, to the future *you are pursuing*?	○	○	○	○	○
Do you think *thinking into the future*, 10 or 20 years from now, is helpful to how you learn?	○	○	○	○	○

13. How important do you think these types of education will be in affecting the future of the Northern Alaska?

	Very Important	Somewhat Important	Neutral	Somewhat Unimportant	Unimportant
Traditional knowledge education	❍	❍	❍	❍	❍
K-12 schooling	❍	❍	❍	❍	❍
Some college education	❍	❍	❍	❍	❍
Vocational training	❍	❍	❍	❍	❍
College degree	❍	❍	❍	❍	❍
Graduate degree	❍	❍	❍	❍	❍

14. How much would you say you know about the following subjects in the Northern Alaska region?

	I know a few facts	I have a good understanding	I know more than most people	I am an expert in this subject
Subsistence Policies	❍	❍	❍	❍
Changes in the natural environment (water and land)	❍	❍	❍	❍
Justice (policing and courts)	❍	❍	❍	❍
Emergency Services (Search & Rescue and Fire)	❍	❍	❍	❍
Public Facilities and Services (non-emergency)	❍	❍	❍	❍
Health Services (non-emergency)	❍	❍	❍	❍
Education	❍	❍	❍	❍
The Concerns of Young People (ages 16-25)	❍	❍	❍	❍

These next questions ask you to think about being resilient in your own life. We ask these questions so that what we learn from you can be used to help other young people to reach their goals without giving up their core principles.

15. Sometimes when we work very hard to achieve a goal we encounter roadblocks. Events or people may prevent us from reaching our goal. When this happens we can adapt to change our strategy to meet this goal or we can give up on the goal. When we adapt we do not want to give up what makes us who we are, for example our cultural beliefs, our family values, or our ethics. *Resilient* is the word used to describe those people, or communities, who are able to adapt and make changes to meet their goals over time and not give up too many of their core principles.

Think of a time that you tried to reach a goal and faced obstacles, what helped you most to have the courage to keep trying?

When you think of giving advice to a friend who might be struggling to reach a goal and facing obstacles what advice do you usually give?

If you wanted very much to achieve a goal but knew that you would have to adapt, to change your strategy for reaching it, what would you LEAST want to change about yourself, your principles, or your life? You can list more than one thing.

16. In these examples below identify from whom you might draw strength to make a decision. For each one, pick only the top THREE you rely on the most.

	Friends	Family members	School teachers or administrators or counselors	Alaska Native Elders or Culture	My own ethics – I usually work out my decisions by myself	A counselor or therapist not affiliated with my school	Religion and religious leaders
When I am facing a difficult personal decision about healthy behavior	❍	❍	❍	❍	❍	❍	❍
When I am facing a difficult decision about my education in school	❍	❍	❍	❍	❍	❍	❍
When I am facing a decision about my cultural heritage	❍	❍	❍	❍	❍	❍	❍
When I think about my future and its possibilities	❍	❍	❍	❍	❍	❍	❍
When my friends or family members are struggling and ask my advice.	❍	❍	❍	❍	❍	❍	❍

If there is something that strengthens you, empowers you, when you are facing tough decisions that we did not list, please write it below:

17. Please evaluate the following statements:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Citizens like myself have no say in decisions made by state and national government.	❍	❍	❍	❍	❍
Citizens like myself have no say in decisions made by the borough.	❍	❍	❍	❍	❍
Citizens like myself are qualified to participate in the debates over U.S. Arctic Policy.	❍	❍	❍	❍	❍
Citizens like myself have viewpoints that are worth taking into consideration.	❍	❍	❍	❍	❍

18. Please answer the following questions:

	Very well	Somewhat well	Not very well
To what extent do you feel informed about policies in the Northwest Arctic Borough tied to community health and sustainability?	❍	❍	❍
To what extent do you feel informed about Alaska state policies tied to Arctic Policy?	❍	❍	❍
To what extent do you feel informed about the U.S. role in the Arctic Council?	❍	❍	❍

19. Within your circle of friends, how often do you discuss issues related to community health and sustainability?

❍ Never
❍ Rarely
❍ Sometimes
❍ Quite Often
❍ Very Often

THE END – THANK YOU!

Appendix 15 AFM Post-workshop Participant Survey

Arctic Future Makers Project

Learning about the Future with High School Students

Post-Workshop Participant Survey

Kotzebue, Alaska

February 23 and 24, 2016

If you have any questions about this survey, contact

Doug Cost

dscost@alaska.edu

(907.474.1556)

University of Alaska Fairbanks

Department of Political Science

PO Box 756420

Fairbanks, AK 99775-6420

Survey Number_____

1. For the following statements, please think of the community (city, village) you live in, and select the answer that best reflects your opinion:

	Very True	Somewhat True	Neutral	Somewhat Untrue	Not True
My community is prepared to face future economic and environmental challenges.	❍	❍	❍	❍	❍
My community is prepared to prosper even in turbulent times.	❍	❍	❍	❍	❍

One of the main goals of scenario creation is to help people think ahead and prepare for surprises, whether good or bad. This section of the survey is designed to help us understand what you think communities may need to be prepared for the future.

NEXT WE ARE ASKING YOU ABOUT SEVERAL DIFFERENT ISSUES THAT FACE NORTHERN REGIONS

Tourism is a factor in the livelihoods of the Arctic Alaska region. It has been discussed in many reports, but we would like to understand what role you think it plays in the future.

2. For each statement, please select the answer that best reflects your opinion.

	Very True	Somewhat True	Neutral	Somewhat Untrue	Not True
In general, I would like to see more tourism in Northern Alaska.	○	○	○	○	○
Currently, tourism in northern Alaska is being done in a way that is consistent with Iñupiaq values.	○	○	○	○	○
Tourism could provide good jobs for residents of northern Alaska.	○	○	○	○	○
I'm worried that more tourism would cause problems in my community.	○	○	○	○	○

Education is a factor in the livelihoods of the Arctic Alaska region. We would like to understand what role you think it plays in the future.

3. For each question please choose the answer that best reflects your opinion.

	Very Important	Somewhat Important	Neutral	Somewhat Unimportant	Unimportant
How important is formal education (K-12 and beyond) to the future *you are pursuing?*	○	○	○	○	○
How do you view the importance of formal (K-12 and beyond) education *for the future of the region?*	○	○	○	○	○
How important is traditional knowledge education, learning skills outside of schools at home or on the land or water, to the future *you are pursuing*?	○	○	○	○	○
Do you think *thinking into the future*, 10 or 20 years from now, is helpful to how you learn?					

4. How important do you think these types of education will be in affecting the future of the Northern Alaska?

	Very Important	Somewhat Important	Neutral	Somewhat Unimportant	Unimportant
Traditional knowledge education	❍	❍	❍	❍	❍
K-12 schooling	❍	❍	❍	❍	❍
Some college education	❍	❍	❍	❍	❍
Vocational training	❍	❍	❍	❍	❍
College degree	❍	❍	❍	❍	❍
Graduate degree	❍	❍	❍	❍	❍

5. When you think about your future, 15 or 25 years from now, what role do you see formal education (K-12, junior or community college, the university) playing in your future?

6. How much would you say you know about the following subjects in the Northern Alaska region?

	I know a few facts	I have a good understanding	I know more than most people	I am an expert in this subject
Subsistence Policies	❍	❍	❍	❍
Changes in the natural environment (water and land)	❍	❍	❍	❍
Justice (policing and courts)	❍	❍	❍	❍
Emergency Services (Search & Rescue and Fire)	❍	❍	❍	❍
Public Facilities and Services (non-emergency)	❍	❍	❍	❍
Health Services (non-emergency)	❍	❍	❍	❍
Education	❍	❍	❍	❍
The Concerns of Young People (ages 16-25)	❍	❍	❍	❍

Lastly, we want to know about the value of the scenarios process to you and your stakeholders. The following questions help us to understand how well we have done our work and what improvements we need to make in future workshops and in other regions.

7. Please evaluate the following statements about the workshop

	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
From the beginning there was consensus in our workshop about the meaning of healthy sustainable communities	❍	❍	❍	❍	❍
Towards the end there was consensus in our workshop about the meaning of healthy sustainable communities	❍	❍	❍	❍	❍
There was often consensus on the subjects discussed in small working groups	❍	❍	❍	❍	❍
It was difficult to agree on any of the subjects discussed in small working groups	❍	❍	❍	❍	❍

8. Please evaluate the following statements about Workshop 3:

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
A few participants dominated the discussions	❍	❍	❍	❍	❍
Alliances between some of the participants arose	❍	❍	❍	❍	❍
The discussions in the small working groups were superficial	❍	❍	❍	❍	❍
There was too little time to discuss	❍	❍	❍	❍	❍
All aspects of healthy sustainable communities were covered in the small groups or during the workshop.	❍	❍	❍	❍	❍

9. Please evaluate the following statements about the workshop

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
The discussions were characterized by responsiveness towards each other's arguments.	❍	❍	❍	❍	❍
I developed an understanding of positions that were opposite my own.	❍	❍	❍	❍	❍
All positions in the group were considered with equal respect.	❍	❍	❍	❍	❍
The arguments of the other participants were useful in forming my own position.	❍	❍	❍	❍	❍

10. Please evaluate the following statements:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lack of knowledge is the reason why other citizens have plans or visions of the future of the region that are different from mine.	❍	❍	❍	❍	❍
Other citizens have good arguments for supporting plans or visions of the future of the region different from mine.	❍	❍	❍	❍	❍

11. Please evaluate the following statements:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Citizens like myself have no say in decisions made by state and national government.	❍	❍	❍	❍	❍
Citizens like myself have no say in decisions made by the borough.	❍	❍	❍	❍	❍
Citizens like myself are qualified to participate in the debates over U.S. Arctic Policy.	❍	❍	❍	❍	❍
Citizens like myself have viewpoints that are worth taking into consideration.	❍	❍	❍	❍	❍

12. Please answer the following questions:

	Very well	Somewhat well	Not very well
To what extent do you feel informed about borough policies tied to community health and sustainability?	❍	❍	❍
To what extent do you feel informed about Alaska state policies tied to Arctic Policy?	❍	❍	❍
To what extent do you feel informed about the U.S. role in the Arctic Council?	❍	❍	❍

Please let us know if you have any other comments or thoughts you would like to share that would help us work with students in the future

Key Factor: Preparation of Teachers and School Administrators

Definition

Local indigenous teachers have navigable pathways in becoming career educators and administrators at their local schools. Recruitment process is transparent, incorporates cultural competencies, and adequately informs new hires of the social and environmental conditions they will face in their new positions. Teachers and school administrators participate in training so that they are better able to design, deliver, administer, and facilitate instruction cross-culturally.

Future Projections

1. Teach for Alaska:

Teachers and school administrators are culturally and professionally prepared. Local teachers are given opportunities to move into leadership roles in the school system. Established culturally relevant curriculum per borough and per community that is linked to the cultural preparation. There is a consistent and mandatory course of cultural preparation for all school employees that immigrate to rural communities to teach. This course of study is either a month during the summer vacation or a semester of coursework on-site while teaching in the school. In similar methods, local teacher preparation is much improved to make the state mandated requirement much simpler to navigate and achieve which puts all rural indigenous school staffs at approximately 60% local and 40% from outside the community. Those chosen from the outside go through a rigorous selection process and sign three-year contracts with the school district through a new program called Teach for Alaska. Local indigenous school employees have fair and clear pathways to advancement and higher positions within organization.

2. The great- adventure- "I got a job in Alaska":

Teacher preparation programs in state like UA system's Schools of Education continue to not produce or provide the needed teachers for rural mostly indigenous schools. Cultural preparation is hit or miss. Barriers to employment continue to baffle most local prospective school employees. Nationalized curriculum, standards, and testing continue to dominate allowing for adventure teachers to proliferate the system.

3. Regional boarding schools:

Local schools close doors because of continued lack of success with school populations. There is no further need for local school employees. Regional boarding schools hire whomever is most qualified according to CV's and resumes. Cultural preparation of teachers is looked back upon as ancient artifact of an old education system.

4. Personalized education plan (PEP) via Internet:

Lack of consensus in communities on how schools should be preparing or governing students. This leads to devolution of current school system model and the individuation of educational process and content, to each his or her own to mixed results. Students stay in their communities but learning is a much less social activity. Learning personnel take roles locally as personalized

learning advisors facilitate the learning process for students. Students develop learning plans biannually with their advisors and a majority of learning occurs via the Internet. Students pursue what interests them with benchmarks that are to be achieved by the close of each learning year. Learning advisors are tasked with the monitoring and supplementing student's self-guided learning to reach benchmarks. Schools are transformed into multi-use community centers that still support some learning activities but more informally and typically in group settings.

5. Local control, local teachers:

State eliminates budgets for public schools. Schools are handed over to local communities. The only teachers that are hired are local teachers. Quality of global education declines and subsequently opportunities for graduates to leave and pursue outside vocational or educational pursuits declines as well. But as a direct result of global compromise, local school curriculum is rife with connections to Iñupiaq language, culture, and tradition. Iñupiaq language revitalizes culture, culture retains a strong sense of valued self, and this mental wellness contributes to a better ability for one to care for one's health. This leads to an Iñupiaq Renaissance...

Additional Discussion

There is no universal and mandatory program for the cultural preparation of outside teachers who come to teach in rural, mostly Indigenous schools. The programs that do exist are tied to inconsistent funding and state budgets. Not all teachers attend cultural camps and those teachers that do often absorb the information and learning at different rates. This knowledge is context-specific and often takes much time to reveal its relevance to teachers and their pedagogy. This system for cultural preparation is in its infancy and has many wrinkles to be ironed out before it effectively prepares teachers in cultural ways to impact the school climate and teaching that goes on in classrooms.

Cultural Preparation of Incoming Teachers

1. Teachers and school administrators are culturally prepared- There is cultural preparation of teachers from outside the community or school personnel are prepared to teach cross-culturally. Around the state some school districts, including NWABSD, are offering a one-week culture camps in the hub community of the district as well as some time out in the bush. In Northern Alaska these culture camps typically take place near Barrow or Kotzebue. Elders and traditional knowledge holders of the area share stories, skills, and knowledge to best prepare the new round of incoming school personnel with some of the cultural norms of the community. Those school personnel who do not attend might occasionally participate in one or two trainings around cultural values/norms during a 1-1.5 hour professional development at the school site.

Culturally prepared school personnel are regularly involved throughout the school year in community activities and social events, with a shadow or mentor to facilitate early years linkages between new school personnel and the culture of the community.

In North Slope Borough School District (NSBSD) the new hires in the district receive training in Iñupiaq traditions and cultural awareness as well as increased awareness or exposure to Understanding by Design, which is a learning-design framework the district utilizes [1] This type of training continues throughout the school year around the Alaska state standards, utilizing Understanding by Design and the Inupiaq Learning Framework pedagogies [1]. The NSBSD has initiated cultural camps to train and prepare new school personnel to engage and incorporate Iñupiaq culture. The goal is to increase teacher retention in the NSBSD by better preparing

teachers through cultural camp experiences. These cultural experiences will better prepare teachers to work with North Slope children and incorporate the Iñupiaq Learning Framework in instructional units that teachers develop per the Curriculum Alignment, Integration and Mapping initiative of the NSBSD.

In Northwest Arctic Borough School District (NWABSD), the cultural preparation process is quite similar to the NSBSD with different pedagogical frameworks.

Advancement of Local, Indigenous, and Iñupiat Teachers within Existing System

2. Local teachers are given opportunities to move into leadership roles in the school system. Local employees and prospective employees of Northern Alaska school districts are seeking regular and certain advancement of local candidates especially from the ranks of paraprofessionals to teachers. Currently local candidates struggle to move up the district workforce ladder. One of the most cited obstacles for vertical movement up the employment ladders is the nation's and Alaska's basic competency exam, the PRAXIS exam. The PRAXIS is cited as being too difficult and limited in applicability in assessing what teachers in rural Alaska need to know. In addition to this, it is important to identify other obstacles that stand in the way of promotion or consideration of teaching as a career choice for local people. The benefits of local community people being pillars of the school are numerous. Local community members being involved in the education of the youth provide: mentorship, school to community to business partnerships, additional skills, knowledge and Iñupiaq language support, and students are able to more readily see the connection between school and community life when community and school are interwoven.

Some schools in Alaska find ways to pay elders and others with Indigenous knowledge or Traditional knowledge to be teacher substitutes/alternatives or co-teachers of curricula. This might be an alternative method to finding avenues to get local people on the payrolls of their local schools.

Key Factor: Preparation of Teachers and School Administrators compiled by Douglas Cost, dscost@alaska.edu.

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2. http://www.adn.com/article/20140913/rural-alaska-high-teacher-turnover-still-vexeshttp://www.adn.com/article/20140913/rural-alaska-high-teacher-turnover-still-vexes
3. http://ceaac.net/documents/teacher_retention_2012_2013/North_Slope_Nuiqsut_Trapper.pdfhttp://ceaac.net/documents/teacher_retention_2012_2013/North_Slope_Nuiqsut_Trapper.pdf

Key Factor: Transmission and Recognition of Traditional Knowledge

Definition

Traditional knowledge is any knowledge that is passed between, and co-created through, the shared intergenerational life experiences of a closely connected group of people. In northern Alaska, accumulated life experiences of more than 100 generations of Iñupiat living intimately with the Arctic environment are a part of traditional knowledge. Transmission should be understood to have multiple possibilities including the transference between knowledge holders and others who may be Indigenous or not, who may be living in rural and indigenous communities or not. Recognition is also twofold. On the one hand it means acceptance of this form of knowledge as existing and containing truth, for example resource managers understanding there is traditional knowledge related to animal migrations. On the other hand it means creating pathways so that traditional knowledge itself can be recognized, for example what language skills must a young person have to recognize and receive traditional knowledge from an Elder? In the last two centuries cultural trauma created by Western colonialism has fractured traditional transmission processes and altered the form and content of current knowledge creation.

Future Projections

1. TK Top Gear:

There is full transmission and recognition of traditional knowledge across the region and among different populations. A system for documentation and dissemination and of traditional knowledge developed by joint groups (e.g. tribal governments, community groups, universities) to recognize and cite the holders and contributors of traditional knowledge. Multiple methodologies developed so that this is not just visual or text-based documentation and sharing. The program is so successful UN adopts as global model. Schools spend 50% of the day practicing and participating in traditional knowledge of local culture and other 50% of the day delivering state developed program of education. Youth consistently engaged in traditional activities within the community as well as sharing skills more broadly in travel to other locales.

2. TK Flourishes then dies out:

Traditional knowledge becomes widely recognized. Local experts regularly cited. Elders held in equal esteem to scientists and academics for the knowledge they hold and convey. Co-management processes include the use of TK in decision-making and planning. But, there is a major disconnect with the transmission of traditional knowledge to younger generations, as such, traditional knowledge experiences a short-lived revival. The revival is followed by gradual disappearance of Iñupiaq traditional knowledge, as the youth cannot be pried from screen time to participate in traditional Iñupiaq customs.

3. TK in Neutral:

Some inroads are made to cite and give credit to traditional knowledge holders but the process and policies are inexact and inconsistently enforced. Collaboration between local knowledge holders and scientists exists sparingly and typically amongst only those with long-term work relationships

and trust capital built through honoring and recognizing traditional knowledge. Transmission of TK is around the harvest of subsistence resources and language use concerning harvest but otherwise Iñupiaq language and traditional knowledge mostly suffers the fate of extinction.

4. TK Separatism:

All collaborations amongst the academy and local Northern Alaska communities are disbanded. Emphasis within communities is only concerned with the transmission of TK to subsequent generations of Iñupiat. A renaissance period ensues around Iñupiaq culture, language, and traditional knowledge. Knowledge bearers feel it has never been stronger. The lack of collaboration with scientists from the academy results in incomplete adaptation based upon traditional knowledge that has not grappled with the rates of change Northern Alaska communities are observing impacting their communities. Communities fall into decline.

5. TK Reverse:

Academics co opt traditional knowledge and use without acknowledgement of source. Generational disconnect develops wider and deeper chasm between generations of potential TK holders and future practitioners. Digital culture develops at exponential speed with terrestrial Internet connectivity. Traditions from Iñupiaq cultures become museum pieces. Iñupiaq language dies off by mid-century, 2050.

Additional Discussion

Traditional knowledge is an inseparable element in defining local culture and identity. It is holistic and involves elements of language and spirituality. There is potential for misunderstanding or tension between local traditional knowledge holders, scientists, and policy makers – while they may recognize the value of the environmental information held within traditional knowledge they often struggle to grasp the spiritual elements.

Traditional knowledge is transmitted through shared life experiences between older and younger generations. There are concerns that such shared experiences are happening less often in the present than in the past. These worries are based on a belief that modern Western entertainment technologies - the Internet, video games, cell phones - are creating a generational divide between younger generations who are quick to adopt their use and older generations who often are not. Important factors in the transmission of traditional knowledge with this type of technology induced generational gap include; 1) time spent participating in intergenerational activities becomes limited, and 2) changes in the types of activities that are experienced jointly in response to the presence of new technologies.

The value of traditional knowledge is increasingly being recognized at community, academic, and governmental policy and planning levels. Academic science and research, in the face of rapidly shifting conditions in the Arctic, have recently become interested in Iñupiaq traditional knowledge in recognition of the enormous volume of current and historical environmental knowledge it contains. However, the holistic and spiritual elements of traditional knowledge do not mesh well with the disciplinary and rational nature of Western science methodology and policy ramifications. This at times has created conflict and led to a strained history between academic researchers and holders of traditional knowledge in northern Alaska. Despite recent progress, this history must be recognized when considering traditional knowledge, its transmission, and how it is recognized and

perceived by both the holders of the knowledge and those who would like to learn from it. Richard Glenn's words perhaps offer some insights on how best to approach this issue:

"Why do Iñupiat share traditional knowledge? Despite the stigma, our community is proud of a long history of productive, cooperative efforts with visiting researchers, hunters, travelers, scientists, mapmakers and others. We share when we consider others close enough to be part of Iñupiat culture and share when it is in the best interest of a greater cultural struggle" (Glenn 2000:13-14).

Background

Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and visual and performing arts. They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge, and traditional cultural expressions (United Nations 2008: 11). 2008 United Nations Declaration on the Rights of Indigenous Peoples

Traditional ecological knowledge (TEK) has the potential to play a vital role in indigenous climate change assessment and adaptation efforts, as well as make important contributions to the climate change efforts of federal agencies, institutions, and organizations at local, national, and international levels. Many indigenous groups, agencies, and organizations are taking steps to facilitate the incorporation of TEK into various climate change initiatives. A key example of this is the resolution on Traditional Knowledge and Climate Change passed in September 2011 by the Affiliated Tribes of Northwest Indians. This resolution illustrates the potential for significant impacts on tribal rights and resources from climate change, establishes the role of TEK in governance and decision making, and emphasizes tribal capacity to be "co-managers in any government climate planning, or mitigation or adaptation measures that affect tribal resources, lands or well-being" (ATNI 2011).

Source:

http://www.fs.fed.us/pnw/pubs/pnw_gtr879.pdfhttp://www.fs.fed.us/pnw/pubs/pnw_gtr879.pdfhttp://www.fs.fed.us/pnw/pubs/pnw_gtr879.pdf

Key Factor: Transmission and Recognition of Traditional Knowledge compiled by Richard Hum and Douglas Cost, rheum@alaska.edu and dscost@alaska.edu.

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1. Glenn, Richard. 2000. "Traditional Knowledge, Environmental Assessment, and the Clash of Two Cultures." In *Handbook for Culturally Responsive Science Curriculum*. S. Stephens, ed. Pp. 13-14. Fairbanks: Alaska Native Knowledge Network.

2. http://www.fs.fed.us/pnw/pubs/pnw_gtr879.pdf

3. 2008 United Nations Declaration on the Rights of Indigenous Peoples

4. **Does One Way of Life Have to Die So Another Can Live?** A report on subsistence and the conservation of the Yupik lifestyle. Yupiktak Bista. Alaska Native Knowledge Network.

Key Factor: Intergenerational Engagement

Definition
Intergenerational engagement describes the interaction and participation among various age groups, in community leadership, events, decision-making, planning, and other community activities.

Future Projections:
1. Generations united:
Throughout the course of the year festivals, community celebrations, and harvest celebrations- like Kivgiq, Halloween are attended by youth, adults and elders. Through these gatherings traditions, cultural knowledge, and Iñupiaq are passed on from generation to generation. Drumming and dancing are important expressions of cultural renewal and vibrancy. Teaching and learning, often of the traditional ways, occurs formally and informally across generations and amongst peer-groups. Communities are building the social fabric via inclusion of all generations and ethnic groups in the processes of deliberation, decision-making, and planning.
2. Generational disconnect:
There is little shared life or experience amongst the generations of the community. The youth gather at the youth center. The elderly gather at the community center. The middle-aged conduct most of the decision-making and allocation of community resources behind closed doors. The youth antagonize both groups through the subversive derailing of programs, vandalism, and refusal to participate. The elderly follow suit mostly refusing to get involved in anything community related that is not specifically elderly oriented. Most citizens congregate within age groups and little if any crossings occur.
3. All in the family:
The only occasion when intergenerational engagement occurs is during family events and it is mostly contained within family units. Groups that gather in the community are aligned along family allegiances and age-similar peer groups. Cross-age or cross-family interactions are rare and there appears to be a lack of trust outside these regular/typical interaction groups.
4. Elmer's- school glue for all generations:
School contains and connects all intergenerational engagement. A multitude of activities around education engage all sorts of citizens in many different events/activities and roles for various community members. School personnel and community have developed a productive model for interaction of generations around education program, policy, and curriculum. Participation in other forms of intergenerational engagement outside of school are mostly non existent either because of lack of time, energy or interest.
5. My piece of pie:
Intergenerational engagement only occurs around governance or decision-making especially around resource distribution. The community lacks any continuity because programs and benefits are enacted in a piecemeal method based on leadership alliances. Leaders represent sectors, supporters and special interests instead of in the best interests of the community at large.

Additional Discussion

The key to intergenerational engagement is finding the methods to engage many generations of community residents in a variety of experiences so that each individual feels and sees that their concerns and ideas are taken into account in the decision-making process. Typically, youth or elders are marginalized in traditional hierarchical community structures. Best practices in developing a more inclusive approach to community engagement are being explored to varying degrees. Full and meaningful engagement of various generational groups requires significant effort, and can introduce additional uncertainty in the decision-making process.

Significant lifestyle and cultural changes of the past century make available a significant breadth of experiences that can, on one side, provide valuable perspective, but also can create conflict. Northern Alaska communities are trying to find a balance between transmission of Iñupiaq language, traditional knowledge and skills in a community structure and education system that is Western in many of its functioning. Additionally in multiethnic communities like Barrow and Kotzebue this also requires building bridges to bring together the various ethnicities in the community to participate, work, and engage. Building on history while not letting it dictate how the present or future is imagined.

"Intergenerational partnerships are based on an understanding of the interdependent, symbiotic nature of learning and teaching, and recognizing that both youth and adults have something different yet equally valuable to share with each other. "[1]

"Although demographic shifts create powerful new opportunities for connection and collaboration, decisions about public investments, land use planning, service delivery and family caregiving are increasingly complex and challenging. Rather than assuming that communities that are good for older adults are also good for younger generations, it is important to develop community change models that intentionally engage people of all ages in collective efforts designed to benefit multiple populations, encourage alliances rather than competition for resources and promote a sense of 'shared fate' across generational, racial and ethnic differences."[2]

Key Factor: Intergenerational Engagement compiled by Douglas Cost, dscost@alaska.edu.

References

Brown, C., & Henkin, N. (2014). Building Communities for All Ages: Lessons Learned from an Intergenerational Community-building Initiative. *Journal of Community & Applied Social Psychology*, *24*(1), 63-68.

Dougherty, I. (2004). The Youth-Friendly Guide To Intergenerational Decision Making Partnerships.

Key Factor: Intersectional Community Engagement

Definition

Intersectional engagement describes the interaction and participation across and amongst various ages, cultures, professions and demographic groups and individuals within the community around leadership, community events, decision-making, planning, and other activities.

Future Projections:

1. United groups of community:

Throughout the course of the year, festivals, community celebrations, and harvest celebrations- like Kivgiq, Halloween are attended by youth, adults and elders across cultures, frequently. Through these gatherings local traditions, cultural knowledge, and Iñupiaq are passed on from generation to generation and amongst the varied cultures of the community. Drumming and dancing are important expressions of cultural renewal and vibrancy. Teaching and learning, often of the traditional ways, occurs formally and informally across generations and amongst peer-groups. Volunteer opportunities abound and are taken up voraciously. There are strong relationships between organizations and the community. Communities are building the social fabric via inclusion of all generations and ethnic groups in the processes of deliberation, decision-making, and planning. Respect and reverence for elders but knowing that there are different paths for every generation, group, and individual. Engagement fosters a culture of support and connection within peer groups and the community for those who stay and those who leave the community.

2. Generational disconnect:

There is little shared life or experience amongst the generations of the community. The youth gather at the youth center. The elderly gather at the community center. The middle-aged conduct most of the decision-making and allocation of community resources behind closed doors. The youth antagonize both groups through the subversive derailing of programs, vandalism, and refusal to participate. The elderly follow suit mostly refusing to get involved in anything community related that is not specifically elderly oriented. Most citizens congregate within age groups and little if any crossings occur. Imbalance between the youth and the elderly population numbers. Either the elderly or the young have out migrated from the community, leaving it heavy at one end of the age continuum.

3. All in the family:

The only occasion when intersectional engagement occurs is during family events and it is mostly contained within family units. Engagement varies widely from family to family. Groups that gather in the community are aligned along family allegiances and age-similar peer groups. Cross-age or cross-family interactions are rare and there appears to be a lack of trust outside these regular/typical interaction groups.

4. Elmer's school glue for all gatherings:

School contains and connects all intersectional engagement. A multitude of activities around education engage all sorts of citizens in many different events/activities and roles for various community members. School personnel and community have developed a productive model for

interaction of generations around education program, policy, and curriculum. Participation in other forms of intersectional engagement outside of school are mostly non existent either because of lack of time, energy or interest. This is a model most often seen in the smaller outlying villages.

5. My piece of pie:

Intersectional engagement only occurs around governance or decision-making especially around resource distribution. The community lacks any continuity because programs and benefits are enacted in a piecemeal method based on leadership alliances. Leaders represent sectors, supporters and special interests instead of in the best interests of the community at large. Certain sub-groups gather around common interests like church, softball, or knitting but cross-pollinations or groups and sharing of ideas is infrequent.

Additional Discussion

The key to intersectional engagement is finding the methods to engage many generations and cultures of community residents in a variety of experiences so that each individual feels and sees that their concerns and ideas are taken into account in the decision-making process. Typically, youth, elders, or cultural groups are marginalized in traditional hierarchical community structures. Best practices in developing a more inclusive approach to community engagement are being explored to varying degrees. Full and meaningful engagement of various generational and cultural groups requires significant effort, and can introduce additional uncertainty in the decision-making process.

Significant lifestyle and cultural changes of the past century make available a significant breadth of experiences that can, on one side, provide valuable perspective, but also can create conflict. Northern Alaska communities are trying to find a balance between transmission of Iñupiaq language, traditional knowledge and skills in a community structure and education system that is Western in much of its functions and outputs. Additionally in multiethnic communities like Barrow and Kotzebue this also requires building bridges to bring together the various ethnicities in the community to participate, work, and engage; working together to build with history while not letting it dictate how the present or future is imagined.

"Intergenerational partnerships are based on an understanding of the interdependent, symbiotic nature of learning and teaching, and recognizing that both youth and adults have something different yet equally valuable to share with each other. "[1]

"Although demographic shifts create powerful new opportunities for connection and collaboration, decisions about public investments, land use planning, service delivery and family caregiving are increasingly complex and challenging. Rather than assuming that communities that are good for older adults are also good for younger generations, it is important to develop community change models that intentionally engage people of all ages in collective efforts designed to benefit multiple populations, encourage alliances rather than competition for resources and promote a sense of 'shared fate' across generational, racial and ethnic differences."[2]

Key Factor: Intersectional Engagement compiled by Douglas Cost, dscost@alaska.edu.

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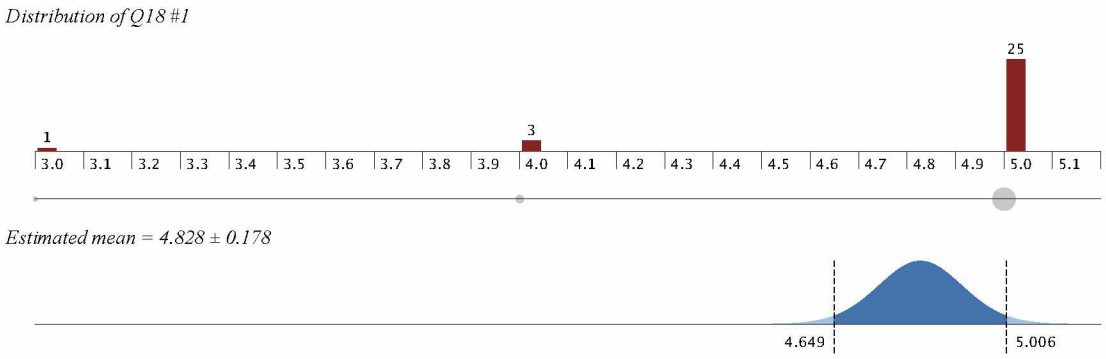
Appendix 17 NASP Survey Question Responses Distribution Graphs

Software used:
Wizard Pro. (Version 1.7.10 , Miller 2015)

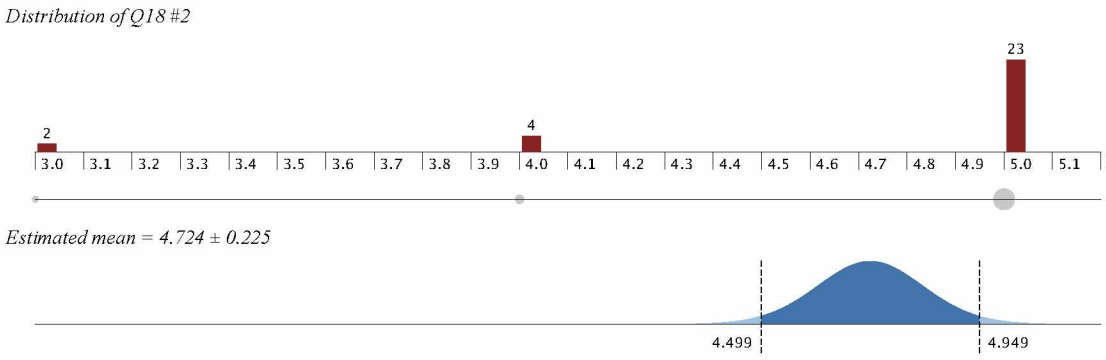
Scale:
Very Important = 5
Somewhat Important = 4
Neutral = 3
Somewhat Unimportant = 2
Unimportant = 1

BARROW, PRE-WORKSHOP

How important is formal education (K-12 and beyond) to the future *you are pursuing?*

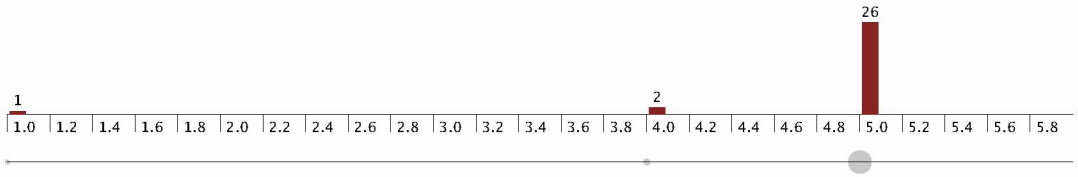


How do you view the importance of formal (K-12 and beyond) education *for the future of the region?*



How important is traditional knowledge education, learning skills outside of schools at home or on the land or water, to the future *you are pursuing*?

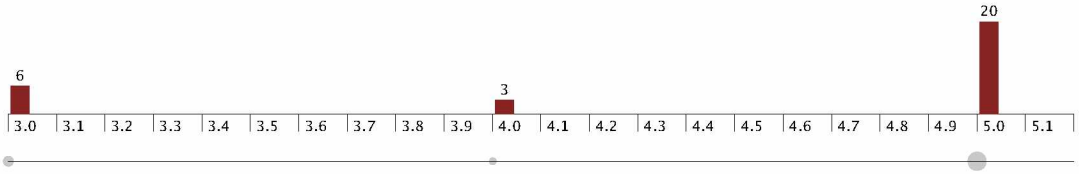
Distribution of Q18 #3



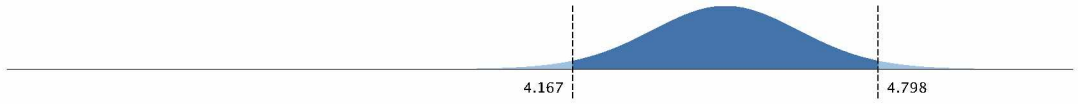
Estimated mean = 4.793 ± 0.294

How important is *thinking into the future*, 10 or 20 years from now, to your current work?

Distribution of Q18 #4

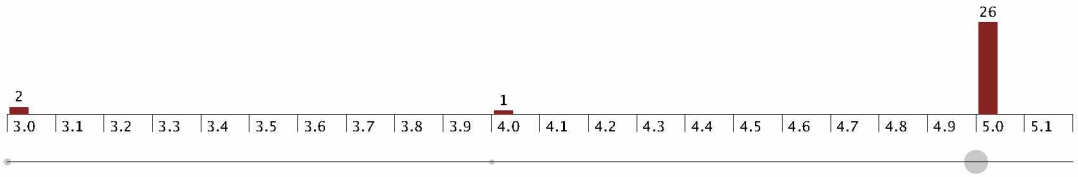


Estimated mean = 4.483 ± 0.315



Traditional knowledge education (how important in affecting region's future?)

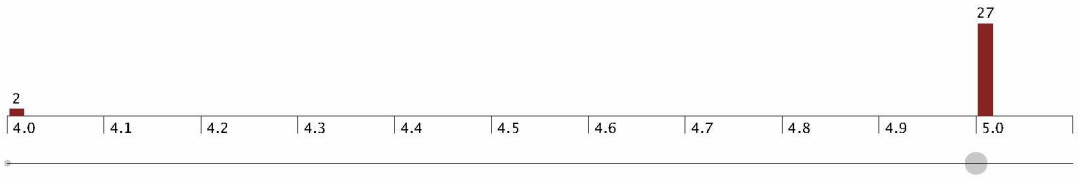
Distribution of Q19 #1



Estimated mean = 4.828 ± 0.205

K-12 Schooling (how important in affecting region's future?)

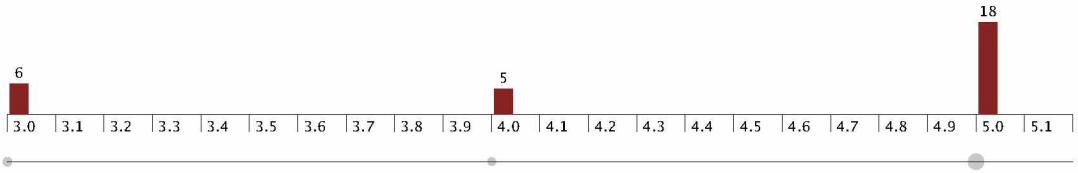
Distribution of Q19 #2



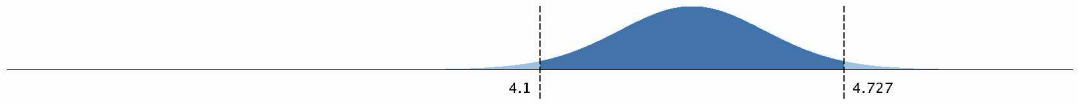
Estimated mean = 4.931 ± 0.098

Some college education (how important in affecting region's future?)

Distribution of Q19 #3

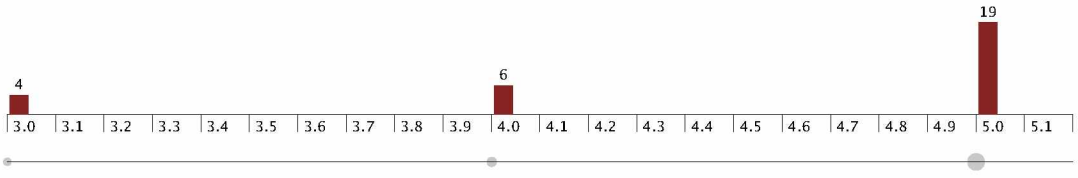


Estimated mean = 4.414 ± 0.314

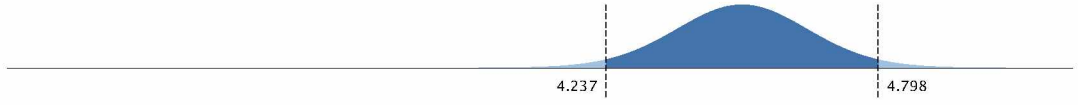


Vocational training (how important in affecting region's future?)

Distribution of Q19 #4

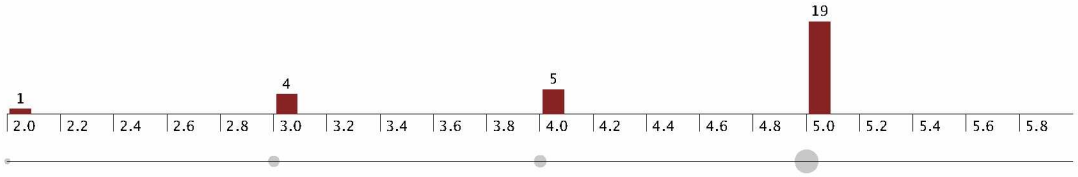


Estimated mean = 4.517 ± 0.281

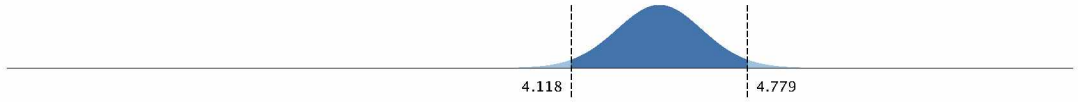


College Degree (how important in affecting region's future?)

Distribution of Q19 #5

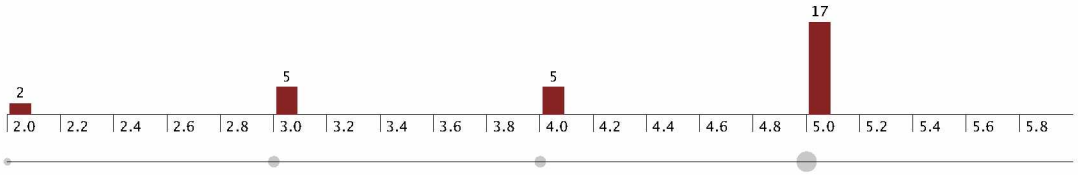


Estimated mean = 4.448 ± 0.331

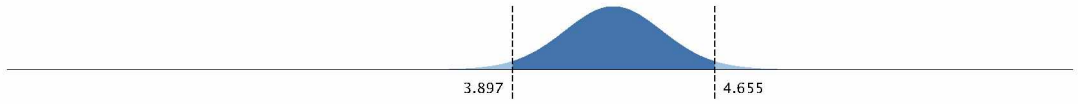


Graduate Degree (how important in affecting region's future?)

Distribution of Q19 #6



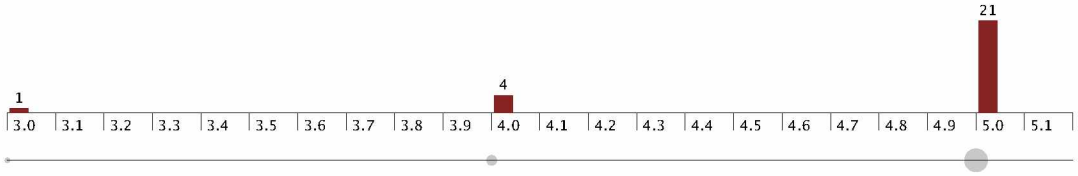
Estimated mean = 4.276 ± 0.379



BARROW, POST-WORKSHOP

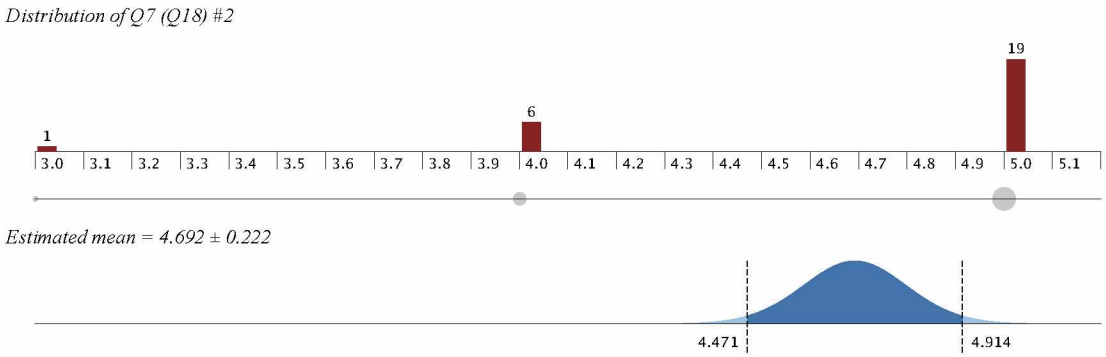
How important is formal education (K-12 and beyond) to the future *you are pursuing?*

Distribution of Q7 (Q18) #1

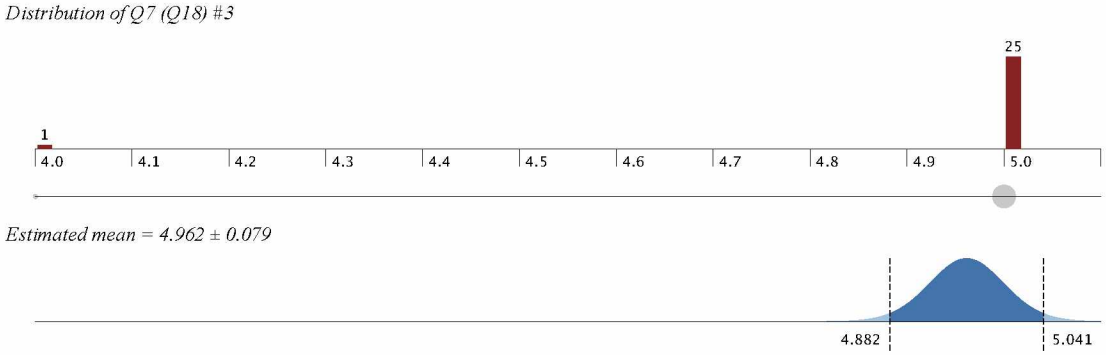


Estimated mean = 4.769 ± 0.208

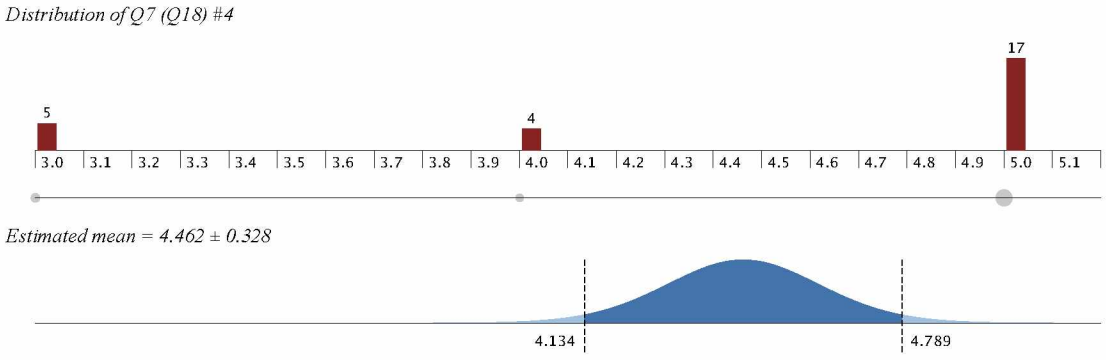
How do you view the importance of formal (K-12 and beyond) education *for the future of the region?*



How important is traditional knowledge education, learning skills outside of schools at home or on the land or water, to the future *you are pursuing*?

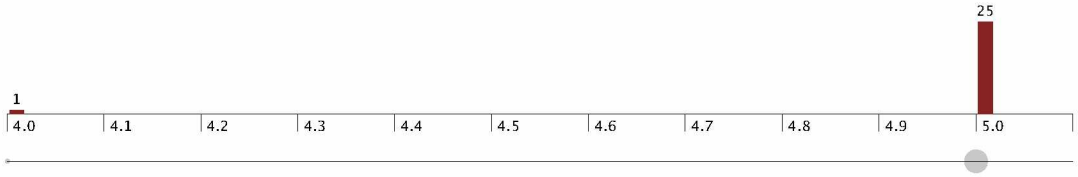


How important is *thinking into the future*, 10 or 20 years from now, to your current work?



Traditional knowledge education (how important in affecting region's future?)

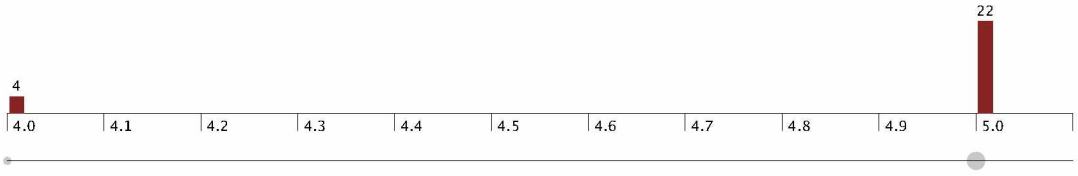
Distribution of Q8 (Q19) #1



Estimated mean = 4.962 ± 0.079

K-12 Schooling (how important in affecting region's future?)

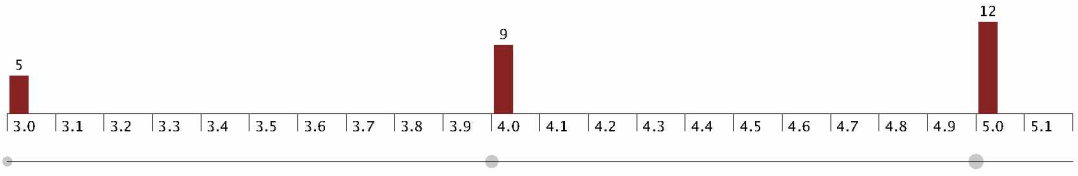
Distribution of Q8 (Q19) #2



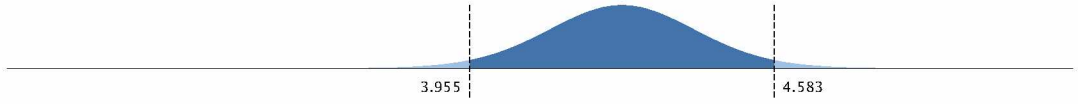
Estimated mean = 4.846 ± 0.149

Some college education (how important in affecting region's future?)

Distribution of Q8 (Q19) #3

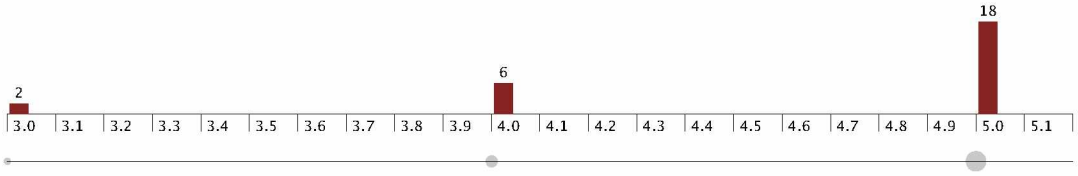


Estimated mean = 4.269 ± 0.314



Vocational training (how important in affecting region's future?)

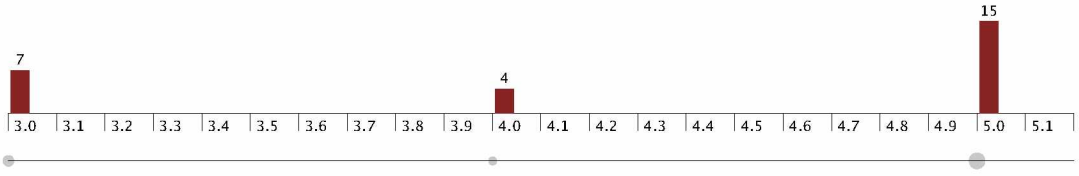
Distribution of Q8 (Q19) #4



Estimated mean = 4.615 ± 0.257

College Degree (how important in affecting region's future?)

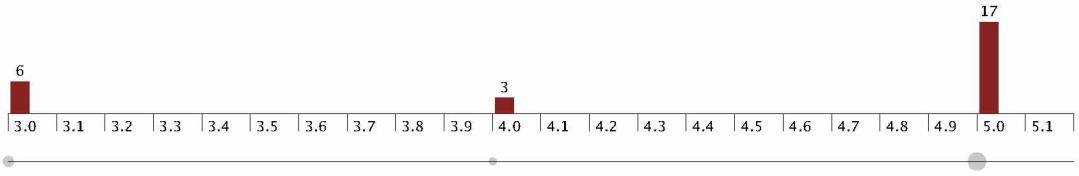
Distribution of Q8 (Q19) #5



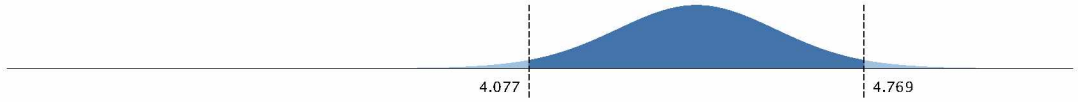
Estimated mean = 4.308 ± 0.357

Graduate Degree (how important in affecting region's future?)

Distribution of Q8 (Q19) #6



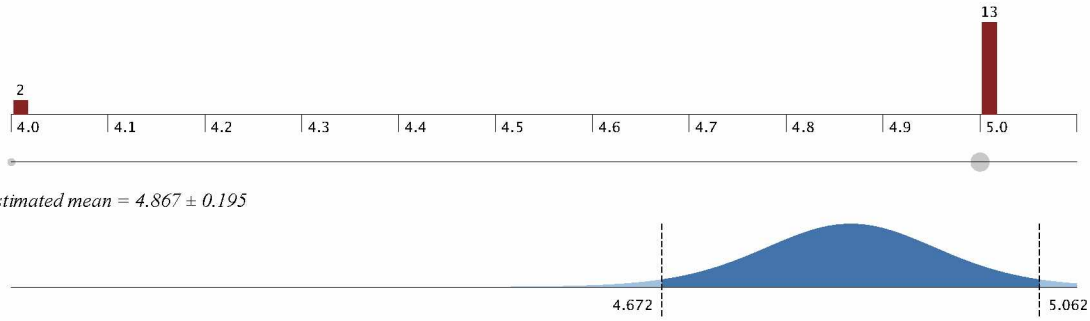
Estimated mean = 4.423 ± 0.346



KOTZEBUE, PRE-WORKSHOP

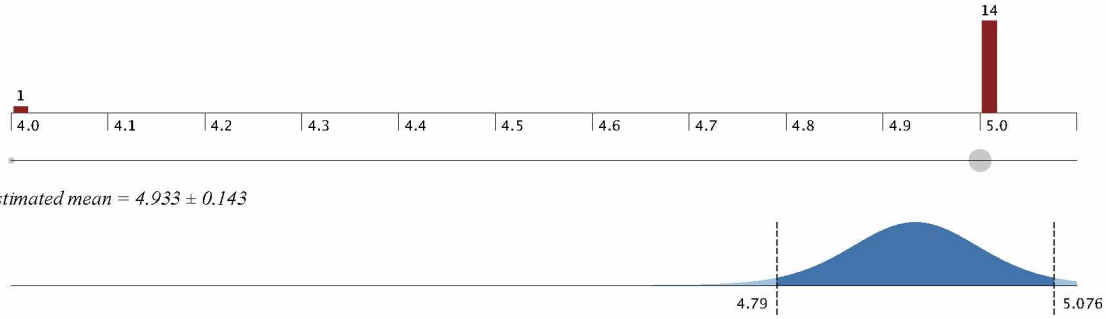
How important is formal education (K-12 and beyond) to the future *you are pursuing?*

Distribution of Q18 #1



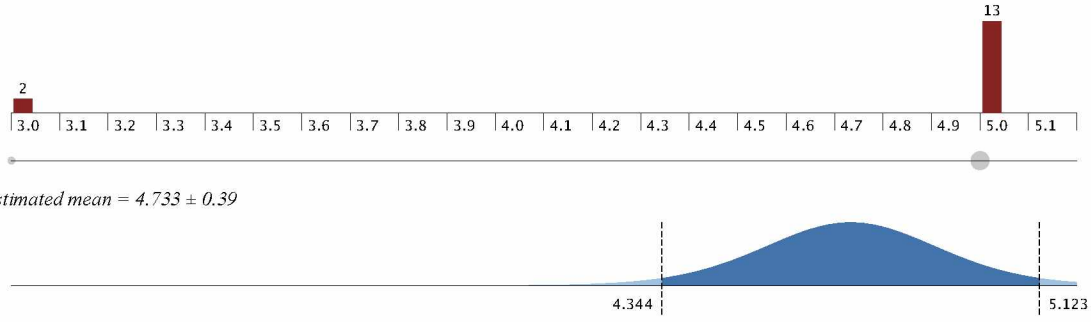
How do you view the importance of formal (K-12 and beyond) education *for the future of the region?*

Distribution of Q18 #2



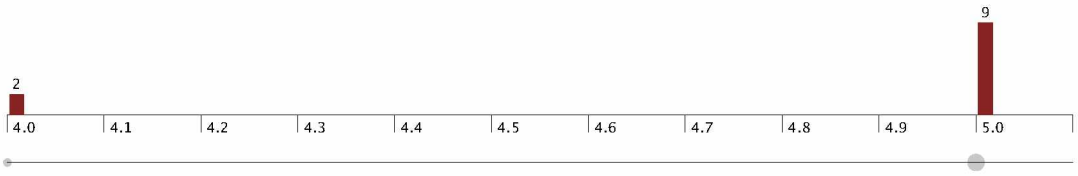
How important is traditional knowledge education, learning skills outside of schools at home or on the land or water, to the future *you are pursuing*?

Distribution of Q18 #3

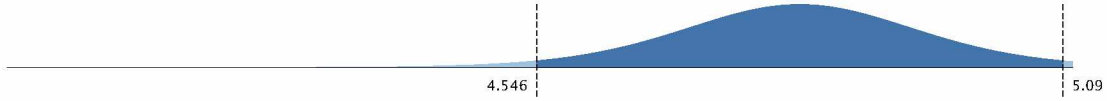


How important is *thinking into the future*, 10 or 20 years from now, to your current work?

Distribution of Q18 #4

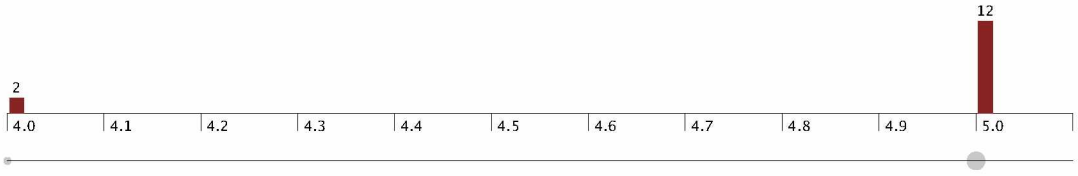


Estimated mean = 4.818 ± 0.272

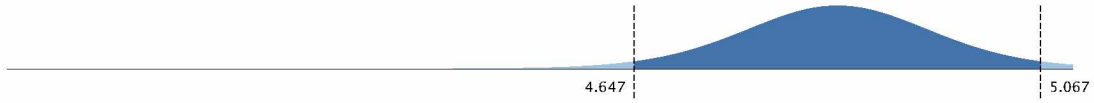


Traditional knowledge education (how important in affecting region's future?)

Distribution of Q19 #1

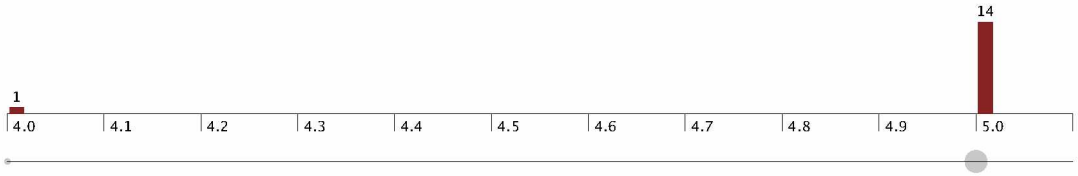


Estimated mean = 4.857 ± 0.21



K-12 Schooling (how important in affecting region's future?)

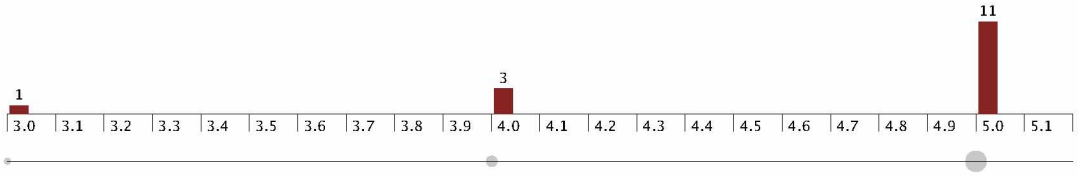
Distribution of Q19 #2



Estimated mean = 4.933 ± 0.143

Some college education (how important in affecting region's future?)

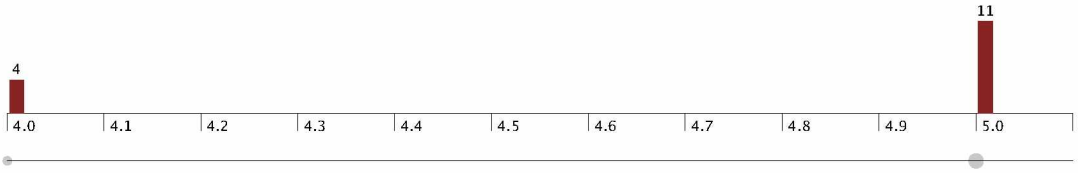
Distribution of Q19 #3



Estimated mean = 4.667 ± 0.342

Vocational training (how important in affecting region's future?)

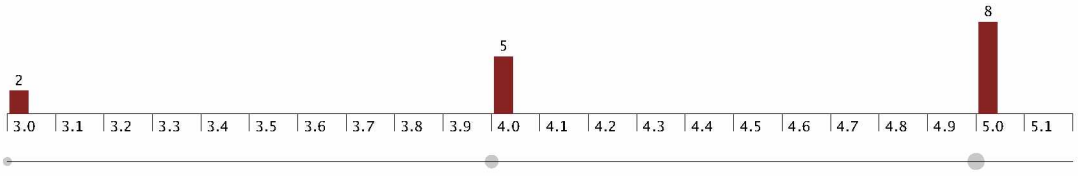
Distribution of Q19 #4



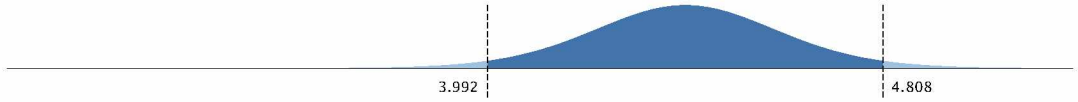
Estimated mean = 4.733 ± 0.253

College Degree (how important in affecting region's future?)

Distribution of Q19 #5

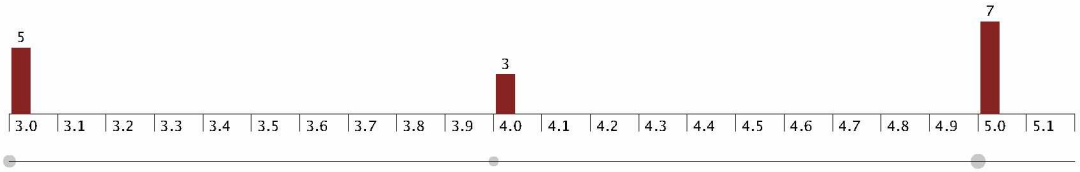


Estimated mean = 4.4 ± 0.408



Graduate Degree (how important in affecting region's future?)

Distribution of Q19 #6

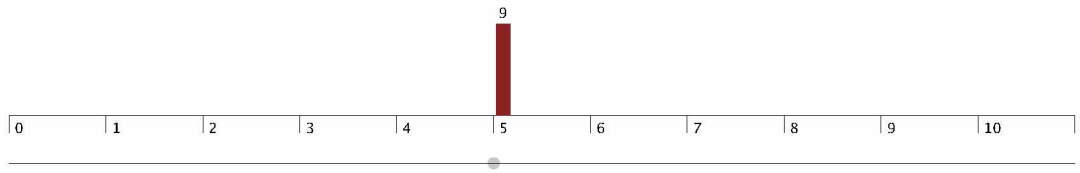


Estimated mean = 4.133 ± 0.507

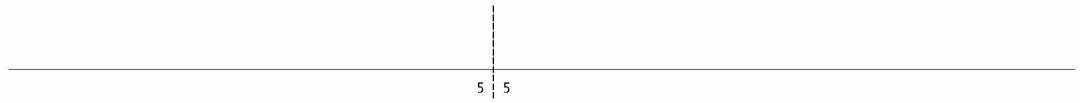
KOTZEBUE, POST-WORKSHOP

How important is formal education (K-12 and beyond) to the future *you are pursuing?*

Distribution of Q7 #1

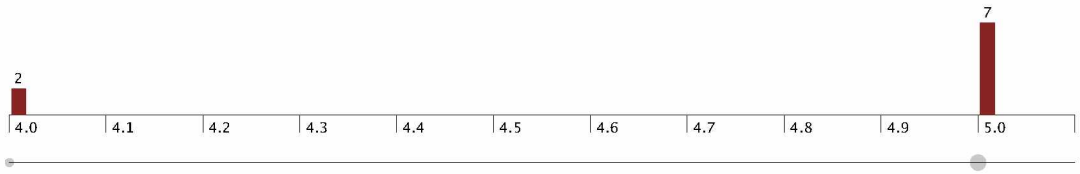


Estimated mean = 5 ± 0



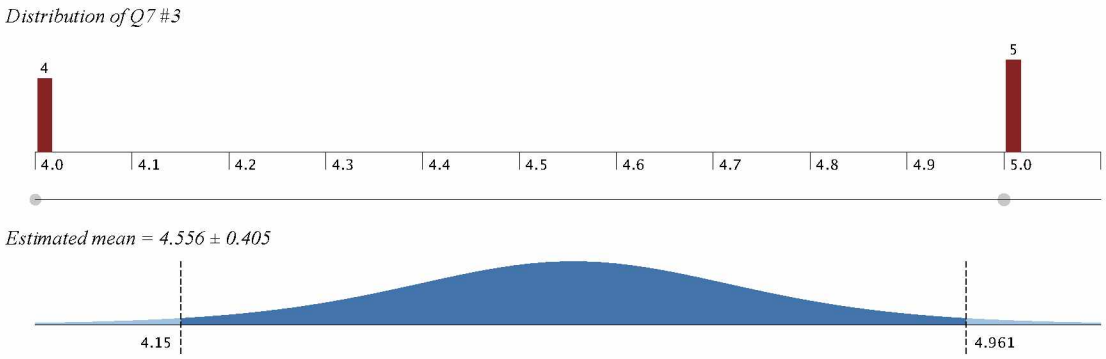
How do you view the importance of formal (K-12 and beyond) education *for the future of the region?*

Distribution of Q7 #2

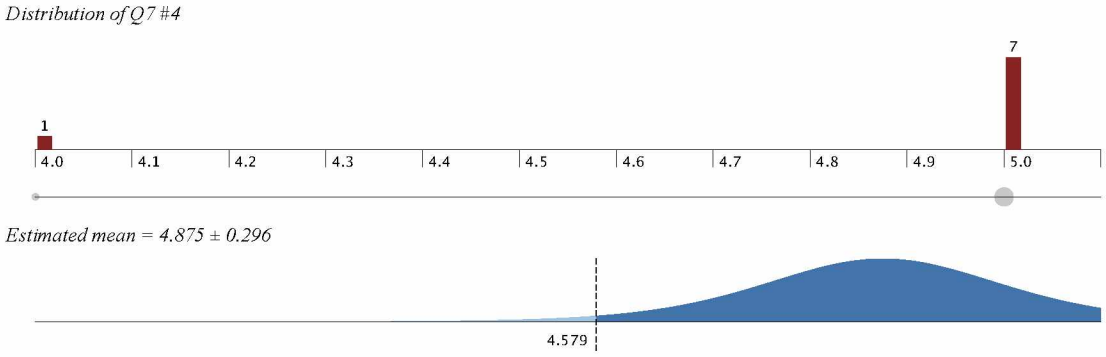


Estimated mean = 4.778 ± 0.339

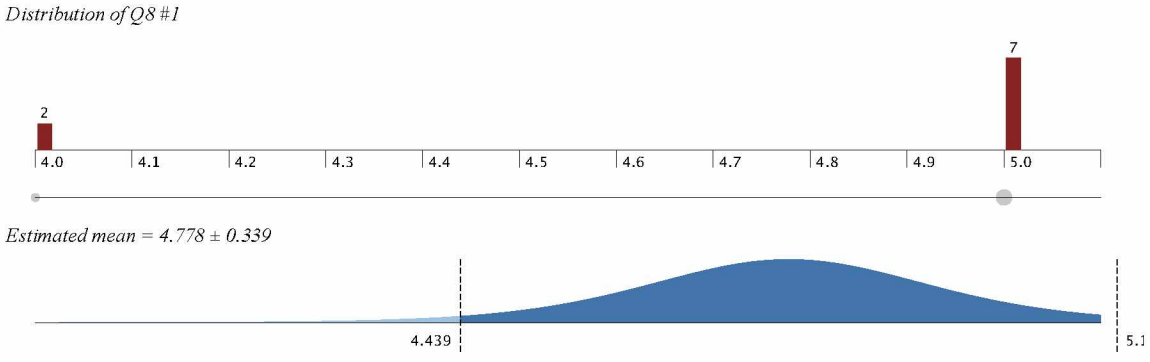
How important is traditional knowledge education, learning skills outside of schools at home or on the land or water, to the future *you are pursuing*?



How important is *thinking into the future*, 10 or 20 years from now, to your current work?

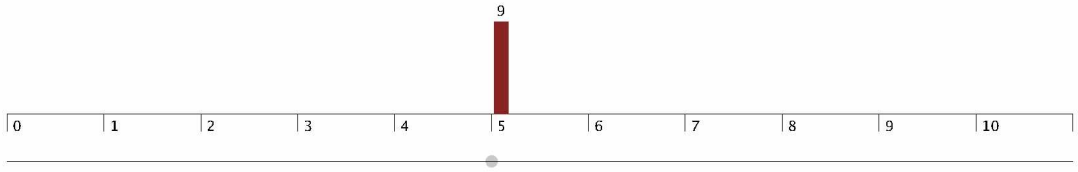


Traditional knowledge education (how important in affecting region's future?)

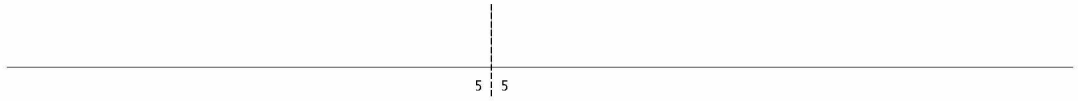


K-12 Schooling (how important in affecting region's future?)

Distribution of Q8 #2

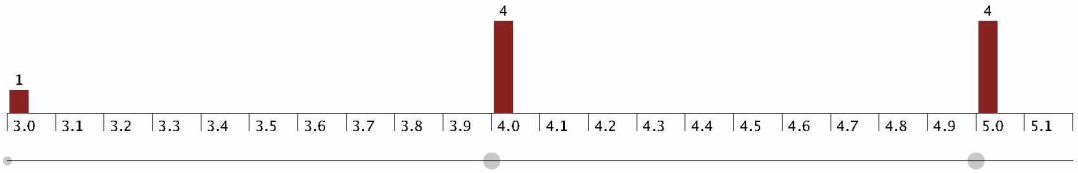


Estimated mean = 5 ± 0



Some college education (how important in affecting region's future?)

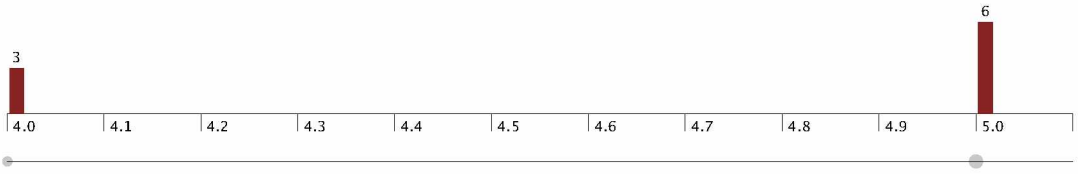
Distribution of Q8 #3



Estimated mean = 4.333 ± 0.544

Vocational training (how important in affecting region's future?)

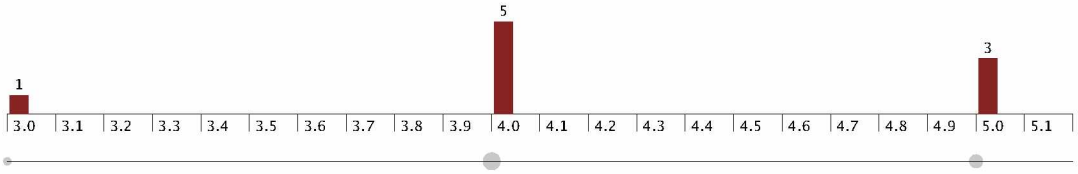
Distribution of Q8 #4



Estimated mean = 4.667 ± 0.384

College Degree (how important in affecting region's future?)

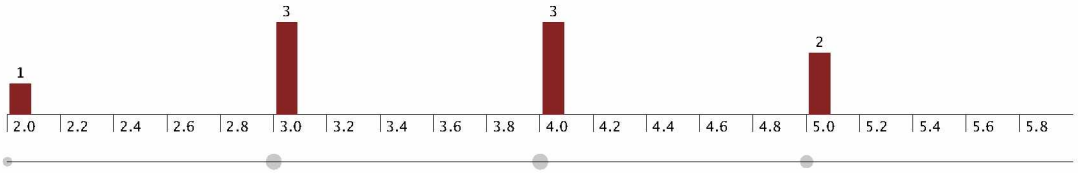
Distribution of Q8 #5



Estimated mean = 4.222 ± 0.512

Graduate Degree (how important in affecting region's future?)

Distribution of Q8 #6



Estimated mean = 3.667 ± 0.769